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BY LEONARD COLEBROOK, M.B., B.S. Lond.
MEMBER OF THE SCIENTIFIC STAFF, MEDICAL RESEARCH COUNCIL

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AND THE MEMBERS OF THE HONORARY STAFF OF QUEEN CHARLOTTE'S HOSPITAL

EARLY in 1935 a startling chemotherapeutic success was announced by Domagk [1] in Germany. Hæmolytic streptococci of human origin were injected into the peritoneum of 26 mice. An hour and a half later 12 of them received by stomach-tube a single dose of a dark red dye, the hydrochloride of 4′-sulphamido-2 : 4-diaminoazobenzol—which had been synthesised by Mietzsch and Klarer (see Hörlein [2]), and all survived, at any rate for seven days. (Their ultimate fate is not stated.) Of the remaining 14 animals which served as untreated controls 13 were dead of their streptococcal infection within three days, and the last 1 on the fourth day. It is of interest to note that some of the treated animals received only 0·02 mg. of the drug—i.e., at least 100 times less than the maximum tolerated dose. So far as we are aware this is the only animal experiment which has been reported from Germany. Domagk described the substance—which was named Prontosil—as showing an "elektive Wirkung" upon streptococcal sepsis but as having some action also on staphylococcal infections in the rabbit.

In France, Levaditi and Vaisman,[3] using a similar compound synthesised by Girard and working with a streptococcus "M" of human origin, obtained curative results in mice which were somewhat similar to those of Domagk but less completely successful. The treated animals did not as a rule survive indefinitely after a single dose of the drug but lived a few days longer than the controls. A little later Nitti and Bovet [4] showed that with hæmolytic streptococci of comparatively low mouse-virulence, freshly isolated from human infections, very little or no curative effect was obtained in mice, while with a strain of high mouse-virulence definite prolongation of life was obtained as in Levaditi and Vaisman's experiments. In their most recent paper Levaditi and Vaisman [5] have claimed that by the subcutaneous administration of a large dose (50 mg.) of prontosil in suspension, mice are frequently protected against a fatal dose of streptococcal culture injected 5–10 days later.

In addition to the reports of animal experiments, there have appeared about a dozen papers in Germany referring to the use of the drug in human infections—e.g., erysipelas, puerperal fever, and so forth (Schreus,[6] Anselm,[7] Schranz,[8] Scherber,[9] Fuge,[10] Kramer,[11] and others). These clinical reports are unanimously favourable, but their evidential value must be regarded as small since, in most cases, the recovery of patients is unhesitatingly ascribed to the treatment, and too little allowance is made for the tendency to spontaneous cure of these infections. The bacteriological and clinical data supplied are nearly always very scanty—e.g., we are not told whether the cases were all infected by hæmolytic streptococci, whether those organisms were present in the blood before the treatment was commenced, nor in how many of the cases there was present any clinical condition, such as generalised peritonitis, which habitually connotes a very high mortality. The papers do serve, however, to indicate that the drug is well tolerated by the human subject and what dosage has given apparently good results.

* A preliminary report to the Therapeutic Trials Committee of the Medical Research Council.

Laboratory Experiments

The following laboratory experiments and clinica trials have been carried out at Queen Charlotte's Hospital.

CURATIVE EXPERIMENTS ON MICE

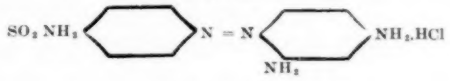
Trials were first made with strains of streptococci freshly isolated from human puerperal infections—i.e., after only two or three passages upon artificial nutrient media.

Mice were inoculated into the peritoneum with an amount of culture which preliminary experiments had shown to contain approximately 10–100 minimum lethal doses. A single dose of prontosil or the more soluble related compound (issued for a time under the name of Streptozon S) was given 1½ or 2 hours after, either by stomach-tube or by subcutaneous injection. In later experiments a series of doses was given—e.g., 1½, 5, 24, 48, 72 hours, and so forth after the injection of culture.

Results.—Although occasionally the treated animals survived a little longer than the untreated controls, there were practically no survivals, and the experiments were regarded as negative, failing to confirm Domagk's claim. Six different strains were employed in such tests.

It is important to note that Domagk's original paper refers to two quite distinct substances, both of which gave curative effects in infected mice. The one, prontosil, has the structural formula shown below (I.) and is only slightly soluble in water (to 0·25 per cent.); the other, issued for a time under the name Streptozon S, but now as prontosil solubile, is the disodium salt of 4′-sulphamido-phenyl-2-azo-7-acetylamino-1-hydroxynaphthalene 3 : 6-disulphonic acid and is represented by the formula II. below. This is soluble up to 4 per cent.

Formula I



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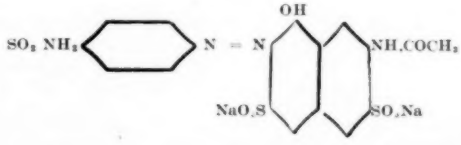

In our animal experiments we have used only prontosil solubile obtained from Germany, and *the French equivalent of prontosil* prepared by Girard. It is possible that the latter substance differed slightly from that used by Domagk in his published experiment. For the *clinical* trials reported in this paper both substances have been administered to every patient—prontosil by the mouth and prontosil solubile by injection—and both had been prepared in Germany.

TABLE I.—*Curative Effect of Prontosil Solubile*

	Deaths in each 24-hour period.									
	1	2	3	4	5	6	7	8	9	—
4 mice were infected with 4000 streptococci ("Richards") intraperitoneally; and 1½ hours later received 7·5 mg. of prontosil solubile subcutaneously. Further doses were given after 1½ hours, 5 hours, and 1, 2, 3, 4, 6 days.	0	0	0	1	0	0	0	0	0	3 remained well and were killed on 60th day.
4 mice were infected as above; and received prontosil solubile (15 mg.) by stomach-tube 1½ hours later—and also the following day.	1	0	2	1	..	..	..	..	..	—
7 control mice (no prontosil). { 4 infected with 4000 streptococci (approx.)	1	3	..	..	..	..	..	..	..	—
{ 3 infected with 400 streptococci	0	2	0	0	0	0	0	0	0	1 survived.

At this point we were informed by the courtesy of Dr. Buttle, of the Wellcome Physiological Research Laboratories, that he had obtained more success with a streptococcal strain "Williams" which we had formerly isolated from a puerperal fever case and sent to him. This strain differed from those we had previously employed in that it had been transmitted through a series of 23 mice and had acquired a very much higher virulence for those animals. Our next experiments were therefore carried out with a similar highly virulent passage strain "Richards" (a different serological type from "Williams"). With this strain we began at once to get striking curative results in mice, although the animals only survived indefinitely if a series of 6 or 7 doses was given over a period of several days. Typical results are given in Tables I. and II.

Comment.—The results shown in these tables—and others like them, not set out here—seem to indicate quite clearly that the administration of the drug does exert some curative effect upon infections by these hæmolytic streptococci in the mouse, which normally terminate in peritonitis and septicæmia. They can be checked in the majority of the animals if treatment is commenced within three hours of the injection of culture. If delayed much beyond that time the death of the animals may be postponed for a day or two but it is not usually avoided. It is of interest to note that one mouse survived after treatment although hæmolytic streptococci were already present in the circulating blood in considerable numbers (a small drop of blood from the tail gave colonies equivalent to 400 per c.cm.) *before the drug was administered.*

PROPHYLACTIC EXPERIMENTS ON MICE

Mice were injected subcutaneously with 50 mg. of prontosil (kindly supplied by Dr. Girard) in aqueous suspension (10 per cent.)—and four days later were given a dose of streptococcal culture into the peritoneum. The mice showed no toxic effect of the drug at any time. The results are shown in Table III. It will be seen that whereas 9 out of 12 of the animals which did not receive the drug were dead within three days, only 2 of the 12 treated mice succumbed to streptococcal infection within that period. (Two died somewhat later.)

When the surviving animals were subsequently killed there was a large deposit of undissolved prontosil at the site of injection, and it seems probable that the prophylactic effect shown in the table was due to slow absorption from this depôt. The urine had an orange colour during the whole 26 days after the mice received the drug.

ANIMAL EXPERIMENTS WITH *p*-AMINOBENZENE-SULPHONAMIDE

In view of the discovery by Trefouel and his collaborators [12] (since confirmed by Goissedet and others [13]) that the diazo linkage in prontosil was not essential for its therapeutic efficacy in animals and that the parent sulphonamide (a colourless compound) was equally effective, we have carried out a few experiments with this latter compound kindly prepared for us by Dr. Harold King, F.R.S., of the National Institute for Medical Research.

The curative effect upon infections by the "Richards" strain is clearly shown in Table IV. No prophylactic effect was obtained when 40 to 50 mg. of the drug was given in aqueous suspension subcutaneously four days before the injection of culture. Probably this was due to absorption of the drug from the subcutaneous depôt more rapidly than in the case of prontosil.

TABLE II.—*Curative Effect of Prontosil Solubile*

	Deaths in each 24-hour period.										
	1	2	3	4	5	6	7	8	9	10	—
8 mice were infected intraperitoneally with approx. 2160 streptococci ("Richards") and 1½ hours later received 7·5 mg. of prontosil solubile subcutaneously. Further doses were given after 5 hours, 20 hours, and 2, 3, 4, 6 days.	0	0	0	0	1	2	0	0	0	0	5 remained well and were killed on 42nd day.
6 mice were infected with streptococci as above; and received the first dose (7·5 mg.) of prontosil solubile 3 hours later. Further doses were given after 7½ hours, 24 hours, and 2, 3, 4, 6 days.	0	0	0	0	0	0	0	0	0	2	4 remained well and were killed on 42nd day.
6 control mice (no prontosil). { 4 infected with 2160 streptococci (approx.)	2	0	1	0	0	0	0	0	0	0	1 survived.
{ 2 infected with 216 streptococci (approx.)	0	2	0	0	0	0	0	0	0	0	—

TABLE III.—*Prophylactic Effect of Prontosil*

		Deaths in each 24-hour period following infection.						
		1	2	3	4	5	6	
12 mice received 50 mg. prontosil subcutaneously.	6 were infected 4 days later with 396 streptococci ("Richards" strain) into peritoneum.	0	1	0	0	0	1	4 remained well and were killed on 22nd day after infection. (1 had a streptococcal abscess, the other 3 were normal and cultures sterile.)
	6 were infected with 3960 streptococci (same strain).	0	1	0	0	0	0	1 died on 17th and 1 on 20th day. 3 remained well and were killed on 22nd day. (Cultures sterile.)
12 control mice (no prontosil).	6 were infected with 396 streptococci as above.	0	4	1	0	0	0	1 survived.
	6 infected with 3960 streptococci.	0	4	0	0	0	0	2 survived.

Upon what Does the Antistreptococcal Influence of Prontosil Depend?

Although there can be no doubt as to the curative effects of the drug in mice its mode of action is at present obscure. The chief positive facts which emerge are that multiplication of the streptococci in the peritoneal cavity is prevented, and that this happens quickly—within a few hours. At present it appears very unlikely that the cocci are actually destroyed, either by the drug itself or by some compound formed from it in the animal body.

EXPERIMENTAL DATA

(1) Although the 2·5 per cent. solution used for treatment kills hæmolytic streptococci slowly (1–3 hours) it does not do so if diluted slightly with serum. A tenfold dilution in human serum just prevented multiplication of the cocci: a 1 in 50 dilution allowed multiplication of 57 cocci to 500,000—i.e., very much less than in control serum without prontosil.

(2) The serum of rabbits taken at intervals—e.g., ½ hour, 2 hours, 5 hours, and 24 hours after a large intravenous dose of prontosil solubile (8–10 c.cm.)—was unable to kill even a very small number of hæmolytic streptococci ("Richards" strain). These grew out as freely as in the serum taken before the drug was given.

(3) The serum of puerperal fever patients taken at intervals after doses also showed no bactericidal effect, but the outgrowth of the cocci in such sera was definitely less vigorous than in the serum taken before treatment. Example: 5 cocci of the strain isolated from Case 26 planted in her serum before treatment began grew out by the following day to 54 millions per c.cm. The same implant of cocci in serum taken one hour after the first intravenous dose (20 c.cm.) grew to 4 millions per c.cm. In serum taken two hours after the third dose (20 c.cm. intramuscular) they grew to 650,000 per c.cm. In serum taken on the third day of treatment—one hour after the fourth dose (20 c.cm. intramuscular)—they grew to 100,000 per c.cm. A similar restricted outgrowth was obtained with the sera of two other patients.

It may be noted that this growth-retarding influence of the patients' sera does not come into operation until after the first four hours of incubation.

Nor is there any evidence that administration of the drug promotes more active killing of the streptococci by the *whole blood*. This has been tested with the defibrinated blood of treated mice and rabbits—the streptococcal population in the bactericidal mixtures being sampled at different intervals—from 1 hour to 24 hours. On no occasion were we able to detect any killing of the "Richards" strain cocci and on several occasions the blood taken after treatment actually allowed more growth than that taken before.

Human *leucocytes* are but little affected by the drug. A concentration of about 1 in 10 of prontosil solubile, 2·5 per cent., in blood is necessary to diminish their bactericidal activity (as indicated by the killing of staphylococcus in slide cells); and we have failed to find satisfactory evidence that at any weaker concentrations their activity is enhanced.

The leucocyte count of patients and of animals under treatment has shown somewhat variable results.

In two patients out of three at the beginning of their treatment there occurred a rise after the first dose (5600 to 9300 in one; 15,700 to 20,000 in the other) and a subsequent fall towards the original level during the next two days. In the third patient there was a fall after the first dose (14,700 to 10,400) and the lower level was maintained. In two mice and one rabbit the count fell for some hours following relatively large doses (7·5 mg. and 250 mg. respectively).

Apart from the slight growth-retarding influence exhibited by the serum of treated cases there is therefore not much to suggest that either the blood fluids or the blood-cells play a predominant part in checking the invasion of the tissues by the streptococci. Nor have we been able to find any indication that the invasive character of the streptococcus is

TABLE IV.—*Curative Effect of p-Aminobenzenesulphonamide in Mice*

	Deaths in each 24-hour period.							
	1	2	3	4	5	6	7	
3 mice were infected intraperitoneally with 30,000 streptococci ("Richards"); and 3 hours later were given 5·25 mg. of sulphonamide subcutaneously. Further doses were given after 9 hours, 24 hours, and 2, 3, 4, 5 days.	0	0	0	0	0	0	0	1 died of streptococcal infection on 32nd day. The other 2 were killed on 35th day and showed no infection. (Cultures sterile.)
3 mice were infected with 30,000 streptococci and received 9 mg. of sulphonamide subcutaneously at intervals stated above.	0	0	0	0	0	0	0	All remained well for 34 days and were killed. (Cultures sterile.)
9 control mice (no sulphonamide). 3 infected with 30,000 streptococci ..	0	2	0	0	0	0	0	1 survived.
2 " " 3,000 " ..	0	2	0	0	0	0	0	—
2 " " 300 " ..	0	2	0	0	0	0	0	—
2 " " 36 " ..	1	1	0	0	0	0	0	—

TABLE V.—*Summary of 38 Cases Treated with Prontosil and Prontosil Solubile*

No.	Age.	Pathological condition.	Blood culture.	Day of puerperium.	Prontosil, grammes.			Days of administration.	Result.	Remarks.
					By injection.	Orally.	Total.			
1	28	Local uterine infection with threatened spread to general peritoneum.	–	4th	6	20·4	26·4	12	R	Very ill, S.R.; T. 104°–106°, P. 140–150 for 24 hours; T. normal without further rise after 0·5 g. i.v. (8 c.cm. antitoxic serum also given).
2	29	„ „	–	6th	2	17·2	19·2	4	R	Very ill, S.R.; T. 104°–105°, P. 140–150 for 24 hours. T. normal without further rise on 4th day of treatment.
3	33	Septicæmia with threatened general peritonitis.	+ (*a*)	5th	3·75	18	21·75	10	R	Very ill, debilitated and anæmic; T. 103°–104° for 5 days. T. and P. normal without further rise, and blood culture negative after 4 days' treatment.
4	36	Local uterine infection.	–	3rd	5·25	25·2	30·45	14	R	Very ill, several rigors, delirium; T. 104°. T. and P. persistently normal after 24 hours.
5	35	„ „	–	4th	4	23·4	27·4	13	R	Very ill, debilitated and anæmic after severe p.p.h.; P. 130–140 for 24 hours, T. over 104°. T. persistently normal after 3 days' treatment.
6	36	Septic endometritis, pelvic cellulitis, and tonsillitis.	–	8th	2·5	17·4	19·9	10	R	Very ill, debilitated, delirious. After admission condition grew worse for 3 days before prontosil. Spectacular improvement, cellulitic mass resolved rapidly.
7	40	Septic endometritis with extensive infected lacerations.*	–	6th	2·5	7·2	9·7	4	R	Condition fair on admission, became steadily worse; T. over 104°. After 1st dose prontosil T. fell rapidly and general condition remarkably improved.
8	40	Septicæmia with pulmonary emboli and multiple metastases.	+	11th	6·25	24·6	30·85	11	R	Very ill. General condition improved steadily; blood cultures negative on 3rd day of treatment. Metastatic abscesses resolved rapidly.
9	30	Pelvic peritonitis threatening to generalise.	–	6th	4·25	18	22·25	10	R	Very ill; T. 103°–104°, P. 120–130 for 48 hours. T. persistently normal after 24 hours' treatment. Threat of general peritonitis rapidly abated.
10	34	General peritonitis.	–	7th	21	23·4	44·4	13	R	Desperately ill. After massive doses of prontosil signs of peritonitis rapidly abated. A very striking result.
11	24	Acute septic endometritis with extensive infected lacerations.	–	4th	5·5	21·6	27·1	12	R	Severe case, drowsy and toxic, S.R. T. and P. fell in 24 hours, but general improvement flagged.
12	29	Pelvic cellulitis, threatened general peritonitis.	–	11th	3·25	27	30·25	16	R	Very ill, S.R. Remarkable improvement in general condition after 24 hours' treatment; signs of peritonitis rapidly disappeared. Treatment suspended too early, cellulitic mass resolved slowly.
13	29	Early generalising peritonitis.	–	7th	1	1·8	2·8	1	R	Very ill. Signs of peritonitis abated within 24 hours. Treatment stopped on account of albuminuria which was present before 1st dose.
14	32	Early generalising peritonitis with septicæmia.	+ (*b*)	4th	5·5	18	23·5	10	R	Very ill on admission; T. 104°, P. 140, rising; diarrhœa. Spectacular remission of symptoms and signs within 24 hours. Steady improvement followed.
15	28	Local uterine infection.	–	11th	2·5	11·4	13·9	7	R	Very ill on admission; T. 104°, P. 130–140 for 48 hours. Several rigors. T. persistently normal after 2 days' treatment. General improvement striking.
16	31	Acute generalising peritonitis.	–	5th	8	18·0	26	10	R	Ill-nourished woman, very ill. Spectacular and rapid abatement of signs of peritonitis.
17	38	Local uterine infection.	–	11th	3	21·6	24·6	12	R	Moderately severe case; T. 103°–104° for 4 days. T. and P. settled rapidly. No spread of infection.
18	28	Septic endometritis with infected lacerations.	–	4th	2·25	12·6	14·8	7	R	Mild case; T. 102°–103°, P. 110–120 for 5 days. T. and P. settled without further rise 48 hours after administration of prontosil.
19	28	Local uterine infection.	–	5th	2·75	18·0	20·75	10	R	Moderately severe case. T. and P. subsided without further rise on 3rd day of treatment. General condition improved rapidly.
20	21	Local uterine infection and tonsillitis.	–	6th	4·25	18	22·25	10	R	Moderately severe case; T. 102°–103°, P. 120. T. and P. persistently normal in 48 hours.
21	26	Local uterine infection.	–	4th	1·75	13·8	15·55	8	R	Mild case. T. and P. persistently normal after 24 hours' treatment. Rapid general improvement in debilitated patient.

* Group B, hæmolytic streptococci.

TABLE V.—*Summary of* 38 *Cases Treated with Prontosil and Prontosil Solubile.*—(*Continued*)

No.	Age.	Pathological condition.	Blood culture.	Day of puerperium.	Prontosil, grammes.			Days of administration.	Result.	Remarks.
					By injection.	Orally.	Total.			
22	22	Local uterine infection.	–	3rd	3·75	21·6	25·35	13	R	Moderately severe case, S.R. T. persistently normal after 3rd day of treatment.
23	30	„ „	Not done.	5th	1·5	5·4	6·9	3	R	Mild case. Afebrile in 24 hours.
24	26	Acute septic endometritis with infected lacerations.	–	3rd	2	23·4	25·4	13	R	Moderately severe case; flabby, anæmic patient, T. 103°–104°, P. 120–130. T. and P. settled rapidly. General condition greatly improved.
25	30	Pelvic cellulitis.	–	8th	1	9	10	5	R	Very ill on admission. General condition improved rapidly, but prontosil probably stopped too soon. Resolution of cellulitic mass was rather slow.
26	29	Local uterine infection.	–	8th	2·25	11·6	13·85	7	R	Moderately severe case; 7 days' fever. T. subsided rapidly under treatment.
27	39	Septic endometritis with extensive infected lacerations.	–	5th	3·5	16·2	19·7	9	R	Moderately severe case. 5 days' fever.
28	29	„ „	–	5th	2·25	14·4	16·65	8	R	Moderately severe case, S.R., rapid resolution of T. and symptoms in 24 hours. Marked general improvement.
29	26	Local uterine infection.	–	5th	2	4·2	6·2	3	R	Moderately severe case, S.R., and severe constitutional symptoms. Prontosil stopped early on account of ? toxic effects.
30	34	Pelvic cellulitis, infected lacerations.	Not done.	10th	1·75	6·6	8·35	4	R	Moderately severe case. T. fell within 24 hours of 1st dose.
31	24	Septic endometritis with infected lacerations.	–	8th	2	7·8	9·8	5	R	Moderately severe case. Rapid resolution of signs and symptoms.
32	32	„ „	–	12th	1·25	9·0	10·25	5	R	Mild case. Rapid recovery.
33	28	„ „	–	6th	5	11·4	16·4	6	R	Moderately severe case. Rapid resolution of signs and symptoms.
34	32	Pelvic cellulitis and extensive infected lacerations.	Not done.	13th	4·5	14·4	18·9	8	R	Late admission, moderately severe case, cellulitic mass already developed. Condition apparently not affected by prontosil.
35	22	Pelvic cellulitis with *B. coli* pyelitis.†	–	9th	2·5	10·8	13·3	5	R	Large cellulitic mass on admission. Grew worse under prontosil ? due to associated pyelitis. Renal symptoms aggravated. Treatment stopped.
36	28	Septicæmia. Thrombophlebitis (ovarian vein).	+ (*c*)	6th	3·75	14·4	18·15	7	D	Extremely severe infection. Blood grew 170 colonies streptococci per c.cm. on admission. No apparent effect of treatment. P.M. showed thrombophlebitis whole R. ovarian vein and pulmonary infarct.
37	30	General peritonitis with septicæmia.	+ (*b*)	11th	2·5	5·4	7·9	4	D	Desperately ill, S.R. General peritonitis probably present several days before admission. No apparent effect of treatment. ? inadequate dosage. (Vide No. 10 supra.) P.M. large peritoneal effusion, R. ovarian thrombosis, metastasis.
38	35	Septicæmia, probably thrombophlebitis. No P.M.	+	5th	12·5	25·2	37·7	10	D	Vide end of Note (1) infra.

(*a*) Before prontosil. (*b*) On admission. (*c*) 6 times. † Group G, hæmolytic streptococci. S.R. = Scarlatiniform rash.

changed by contact with the drug or any hypothetical compound formed from it in vivo.

Cocci of the "Richards" strain were suspended for four hours at 37° C. in normal rabbit serum to which prontosil solubile had been added (1 in 8 of the 2·5 per cent. solution); in the same serum without prontosil; and in serum taken from a rabbit which had received 8 c.cm. of prontosil intravenously an hour before. The mouse-virulence of the three samples of cocci remained the same after the four-hour period of incubation.

It has been suggested (Levaditi and Vaisman [14]) that the formation of a protective capsule by the streptococcus is interfered with under the influence of the drug, but this again is not confirmed by our experiments. The virulent "Richards" strain was found to form capsules readily when grown in defibrinated blood. (Wright's stain as recommended by Seastone.[15]) They were demonstrated just as readily when the blood contained prontosil.

The possibility that the cocci in the treated animals might cease to elaborate certain toxic products which may be directly responsible for death is under consideration, but at present we know of nothing in support of it.

Finally, we have to keep in mind the possibility that the drug activates the reticulo-endothelial system—or some other tissue which may play a vital, but as yet unknown, part in checking invasion by this microbe.

Clinical Experiences with Prontosil

In view of the fact that the cure of mouse infections had been obtained only with hæmolytic streptococci

in a condition of unusual virulence, and not in the condition in which they are usually recovered from human infections, it seemed somewhat doubtful whether an analogous curative effect would be exerted in the human subject. But the exact significance of a high mouse-virulence is very imperfectly understood at present and, since all the clinical reports on the treatment of human infections in Germany were very favourable, it was decided to undertake clinical trials on a group of puerperal fever cases all known to be infected with hæmolytic streptococci. (All group A except two.)

The 38 cases summarised in Table V. were all under treatment in the isolation block of Queen Charlotte's Hospital. The list includes every case to whom the drug has been given, with the exception of :—

(1) Mrs. A. B., to whom it was given on admission under the mistaken impression that she would prove to be infected by hæmolytic streptococci. On finding that this was not the case we continued the drug for five days in order to see whether it would affect the course of the fever. It did not appear to do so. She ultimately developed a large abscess of the buttock due to infection by an unidentified anaerobic bacillus (Gram negative).

(2) Mrs. B. C., to whom the drug was given for the same reason as above but discontinued after two days on finding that her fever was due to *B. coli* pyelitis. The temperature had already become normal when the treatment was stopped and remained so.

At first only the more severe cases (10 in number) were treated by prontosil, but during the last few weeks we have included every case (28) infected by hæmolytic streptococci unless there was any contra-indication—e.g., nephritis. No other "specific" treatment has been employed at the same time, except in the case of two patients, Nos. 1 and 11, a single small dose (8 to 10 c.cm.) of antitoxic serum (because they presented an intense scarlatiniform rash). On account of the very severe constitutional disturbance caused by these doses of serum (intravenous) they were not repeated.

Dosage.—We have followed the more recent German authors in using rather large doses (actually very much less, weight for weight, than those which give curative effects in mice). At first 20 c.cm. of the 2·5 per cent. solution now issued as prontosil solubile (0·5 gramme) was injected either intravenously or intramuscularly each day, and six tablets per diem, each containing 0·3 gramme of prontosil, were given by mouth. Latterly the amount given by injection in several cases has been increased to 40 c.cm. per diem (occasionally 60 or even 90 c.cm.), and this amount has been diminished pari passu with the clinical improvement of the patient. The total amounts given are shown in Table V.

In view of the sometimes severe, although transient, malaise and nausea induced by the intravenous administration of 20 c.cm. doses we have recently employed this route only for the first treatment and given subsequent doses intramuscularly. Since the drug is absorbed very rapidly it is doubtful whether any advantage is secured by intravenous injection. Intramuscular doses, given rather slowly, cause no pain and have not resulted in any local inflammation or abscess formation.

COMMENTARY ON THE 38 CASES SUMMARISED IN TABLE V

General analysis.—It behoves us to be very cautious in drawing conclusions as to the curative effect of any remedy upon puerperal infections such as those due to the hæmolytic streptococci in which the exact significance of signs and symptoms is notoriously difficult to assess with accuracy, and in which the prognosis is correspondingly difficult to estimate. At every point it is a matter of fine judgment, instructed by long experience.

Forty-five per cent. of our cases, Nos. 17 to 33 in the table, were judged by us to permit of no conclusion as to the effect of the treatment. All of them would, in all probability, have recovered without the treatment—and perhaps as quickly.

Another group, representing 42 per cent. of the cases (Nos. 1 to 16), left us with the impression that the drug had in all probability hastened or determined recovery from the infection. All these were cases which undoubtedly presented signs and symptoms of septic infection so severe as to give ground for anxiety ; and cases which, in the light of our previous experience over several years, surprised us by the prompt clinical improvement and remission of fever following the first few doses of prontosil. It is worthy of note that the average age of this group was 31·8 years.

Three of the cases of this group, Nos. 10, 14, and 16, were of specially great evidential value. Although exploratory laparotomy was not performed there was good reason to suppose that in all 3 cases the infection had already involved the general peritoneal cavity (abdominal as well as pelvic) and was quickly becoming diffuse. Case 14 had, in addition, a few streptococci in the blood stream—a circumstance which made the prognosis extremely grave. In this latter case, and in Case 16, the indications of diffuse peritonitis disappeared within 48 hours, and in Case 10 a little more slowly, after the beginning of treatment by very large doses of prontosil (60 c.cm. per diem, by injection, as well as six tablets by mouth for the first few days. In view of the generally recognised gravity of this condition—and taking into account the fact that all three women were over 30 years of age—it appears to us very unlikely that they would have made a spontaneous recovery. In 5 other cases of this group there were indications on admission that a spread of infection from the pelvic to the abdominal peritoneum was beginning. Those indications quickly disappeared.

The clinical course of 5 cases, Nos. 34 to 38, did not run so smoothly. In 2 of them who recovered (Nos. 34 and 35) we had a suspicion that the treatment might be exerting an unfavourable effect, and in 1 of these (infected by a group G streptococcus) improvement did set in as soon as the drug was discontinued. The other case, No. 34, did not come under treatment till the thirteenth day of the puerperium, with cellulitis already developed. She was a very neurotic subject. Cases 36 and 37 who had an overwhelming infection on admission—a heavy septicæmic invasion in the one and a fully developed diffuse peritonitis (probably of several days' standing) in the other—showed no apparent effect of the treatment one way or the other. It may be noted that in neither of these cases did we employ the heroic doses which seemed to give an unexpectedly good result in Cases 10, 14, and 16. The post-mortem findings of Case 36 suggested that she might possibly have recovered had we done so.

The last case (No. 38) of very severe septicæmia without peritonitis does not allow of any definite conclusion as to the influence of the prontosil. Treatment began within two days after the first rise of temperature (the blood then growing 40 colonies of streptococci per c.cm.) and was continued very vigorously for seven days, but the temperature did not fall satisfactorily and streptococci were grown again from the blood on three more occasions (60, 12, and 96 per c.cm.). After eight days, although her general condition remained remarkably good, she became exhausted by the frequent large injections (20 c.cm., t.d.s.) and the drug was discontinued

altogether. In all probability her septicæmia was attributable to an extensive thrombo-phlebitis—streptococci being continually thrown off into the blood stream from the breaking down blood-clot. It is hardly to be expected that any chemotherapeutic agent can come into effective operation upon the microbes in such a focus. After an interval of seven days, during which her condition grew worse and her blood gave three more positive cultures, she was given two still larger doses (100 and 150 c.cm. by intravenous drip with a 24-hour interval), but she died on the sixteenth day.

MORTALITY-RATES OF TREATED AND UNTREATED CASES

There have been 3 deaths in the 38 cases treated by prontosil—that is 8 per cent. In considering the significance of this figure it has to be borne in mind that the first 10 cases were chosen because they were severe or moderately severe cases—the mildest being deliberately excluded; and, further, that the death-rate fluctuates to some extent according to whether few or many late cases—particularly late peritonitis cases—are admitted to the hospital. The following figures give an idea of the usual mortality-rate for *all cases* admitted to the isolation block and found to be infected by hæmolytic streptococci.

In the 38 cases admitted immediately prior to the use of prontosil (August to December, 1935) there were 10 deaths—i.e., 26·3 per cent. In the 38 cases immediately preceding these (March to July, 1935) there were 9 deaths—i.e., 23·7 per cent. During the four years 1931–34 the rate varied between 18 and 28·8 per cent. (average 22 per cent.).

While, therefore, there would appear to have been a very considerable reduction of the death-rate among the prontosil-treated cases it would be unwise to assume on the basis of so small a series that the reduction will be maintained. Nevertheless we are of the opinion that the very low death-rate, taken together with the spectacular remission of fever and symptoms observed in so many of the cases, does suggest that the drug has exerted a beneficial effect. It may be added that there is no reason to ascribe the clinical results to any other change in the local or general treatment of the cases.

TOXIC AND OTHER EFFECTS ASSOCIATED WITH THE TREATMENT

A remarkable feature has been the sensation of burning, chiefly located in the infected tissues, which is experienced by some patients (not by all) during the intravenous injection of 10–20 c.cm. of prontosil solubile. This was particularly well marked in the case of a medical man suffering from acute streptococcal sepsis of the hand. As previously stated, a number of patients have also experienced a rather unpleasant feeling of faintness and nausea (and sometimes an urgent desire to defæcate) for a few minutes following the intravenous injection of 20 c.cm.—not intramuscular injection. In the case of the medical man just referred to there was a much more prolonged feeling of ill-being but this has been quite unusual. The skin has acquired a slightly red or terra cotta tinge in several of the cases who received large doses of the drug.

The urine is always deeply tinged by the dye during the treatment and, contrary to the experience of the German authors who have reported upon clinical trials, many of our cases have given evidence of a mildly irritant effect upon the urinary tract tissues. About 75 per cent. of them have shed epithelial cells in varying numbers at some time during the treatment; a much smaller number (40 per cent.) have passed red blood-cells and a few of them also casts. Case 10, who received 44 grammes of the drug, had a considerable number of casts, red blood-cells, and epithelial cells towards the end of the treatment. The casts disappeared within a week but the red cells persisted somewhat longer.

In 70 per cent. of the cases treated no albumin was found in the urine during treatment, or there was no increase of the trace originally present. Twenty per cent. showed a slight increase of the albumin (a trace) originally present—or developed a trace under treatment.

Ten patients (8 of them from the Group 1–16 who had received fairly large doses of the drug) have shown no indications of renal or other ill-effects on routine examination 3–5 weeks after discharge from the hospital.

The most striking toxic manifestation has been the development in 3 recent cases of cyanosis—associated with suphæmoglobinæmia.

In No. 30 the condition was first noticed on the third day of treatment, after she had received only 4·0 grammes of prontosil. As the possible connexion with the drug was not at first suspected she received treatment for three more days, the cyanosis becoming all the time more intense, but unaccompanied by any increase of the respiratory rate or subjective symptoms. No active treatment for the cyanosis was adopted, and it diminished very much within ten days after the discontinuance of prontosil.

No. 31 had been under treatment for five days (9·8 grammes in all) when the cyanosis first attracted attention, and like the other case had made a good recovery from a mild infection. Her cyanosis was never so deep as that of No. 30.

No. 33, another case of mild uterine infection, had received 16·4 grammes of prontosil during six days' treatment before the cyanosis was noticed. She also showed no respiratory embarrassment or other symptoms.

Spectroscopic examination of the blood of all 3 cases by our colleague, Dr. A. T. Fuller, showed the presence of sulphæmoglobin.

The association of this condition with the taking of an azo dye recalled the description of some similar cases by van den Bergh and Revers [16] following the administration of pyridium. These authors suggested that the simultaneous taking of magnesium sulphate in their cases might have contributed to the development of sulphæmoglobinæmia. Whether this hypothesis can be substantiated we do not know, but as a matter of fact we found on inquiry that all of the prontosil-treated cases had also been taking magnesium sulphate.

It is too early yet to assess the importance of the sulphæmoglobinæmia in the affected cases. A note with regard to their subsequent history, and as to the occurrence of any fresh cases, will be submitted later.

SURVIVAL OF HÆMOLYTIC STREPTOCOCCI IN PRONTOSIL-TREATED CASES

In about 60 per cent. of puerperal fever cases infected by hæmolytic streptococci these organisms continue to be present in the discharge from the uterus for at least three or four weeks—sometimes much longer. Routine examinations have shown that they persist for approximately the same length of time in the prontosil-treated cases.

Summary and Conclusions

(1) A single dose of prontosil or prontosil solubile given by stomach-tube or subcutaneous injection did

not suffice to save mice infected 1–2 hours earlier with hæmolytic streptococci (group A), but subcutaneous injection repeated daily for six days was usually effective—even against 100 to 1000 minimum lethal doses.

(2) Such curative effects in mice were only obtained against hæmolytic streptococci of very high mouse-virulence; they were not obtained with 6 strains of medium or low mouse-virulence, freshly isolated from human infections.

(3) A large subcutaneous dose (50 mg.) of prontosil in suspension protected mice against infection four days later with the highly virulent streptococcus. Protection after a longer interval was not tested, but absorption of the drug from the subcutaneous depôt continued for at least three weeks, as judged by discoloration of the urine.

(4) Curative effects in mice (but not prophylactic effects) similar to those obtained with prontosil were obtained by repeated injections of the colourless compound, *p*-aminobenzenesulphonamide.

(5) Thirty-eight puerperal fever cases infected by hæmolytic streptococci have been treated by oral plus intravenous or intramuscular doses of prontosil. Subject to confirmation by further experience the impression has been gained that in many of the more severe cases the drug has exerted a definitely beneficial effect, manifested by unexpectedly prompt fall of temperature and remission of symptoms; and this impression is supported by a substantial reduction in the case-mortality of the whole series. Three patients in whom there was judged to be a generalising peritonitis on admission (one with a positive blood culture) have recovered without laparotomy under very large doses of the drug. The clinical results, together with the mouse-protection experiments, support the view that further clinical trial is amply justified, and that there is more hope of controlling these streptococcal infections by the early administration of this or some related chemotherapeutic agent than by any other means at present available.

(6) While the drug has been well tolerated by most of the patients there have been transient toxic effects in some cases, and many have shown indications of a mildly irritant effect upon the tissues of the urinary tract. Three cases have developed sulphæmoglobinæmia.

(7) There is at present no indication from animal experiments that the drug is likely to have a beneficial effect upon puerperal infections by organisms other than the hæmolytic streptococci; and in view of the toxic effects referred to above its administration should be confined to such cases.

(8) Apart from the fact that growth of the streptococcus is somewhat retarded (*although not suppressed*) in the serum of patients under treatment by the drug very little is known at present as to the nature of its antimicrobic influence in the animal body. On the one hand the invasive character of the streptococcus seems to be unchanged by contact with the drug or the serum of treated animals; and, on the other hand, there is no evidence of any "immune-response" being evoked by the drug.

The prontosil used in this clinical investigation was supplied to the Therapeutic Trials Committee by Messrs. Bayer Products Ltd., to whom acknowledgments are due.

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PROTECTION OF MICE AGAINST STREPTOCOCCAL AND OTHER INFECTIONS BY *p*-AMINOBENZENESULPHONAMIDE AND RELATED SUBSTANCES

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MANY attempts have been made to protect animals against bacterial infections by means of antiseptic drugs. The most successful of them was that of Morgenroth and Levy [1] who showed that ethyl dihydrocupreine (Optochin) would protect mice infected with pneumococci. Protection against streptococci had not been demonstrated until Domagk, who was working with azo-dyes, noticed that the presence of a sulphonamide group, while lessening the efficiency of the dye as an antiseptic in vitro caused it to protect infected mice (Hörlein).[2] In 1935 Domagk [3] reported a very notable effect with one of these dyes, the hydrochloride of 2:4-diamino-azobenzene-4′-sulphonamide (Prontosil, formula I.). One dose varying from 0·02 to 10 mg. given an hour and a half after infection was effective against a lethal dose of one strain of streptococcus inoculated into the peritoneum. Domagk showed that scrapings of peritoneum taken 48 hours after infection were free from cocci in treated mice, whereas large numbers of cocci were present in the controls. In a later paper the same author [4] states that the administration of 1/10 to 1/50 of the tolerated dose (0·2 to 1 mg.) for three to five days after infection protects most of the mice, and that some less acute infections could be controlled with 1/100 to 1/500 of the tolerated dose.

Levaditi and Vaisman [5] confirmed the results of Domagk, but they were not able to protect every treated mouse, although all the mice showed delay in the time of death. These authors noted that the dye was not active against the staphylococcus, the paratyphoid bacillus, bacillus pseudotuberculosis, or Friedländer's bacillus. They showed that the cocci could be recovered from the spleen of the treated animals up to the eighth day after infection, but that if the animals lived longer than this the spleens were sterile. Nitti and Bovet [6] confirmed the general result, but they could not protect every mouse; they found that

(*Continued from previous column*)

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TABLE I.—*Treatment of Mice Infected with Streptococci (Strain "Richards"). Comparison of p-Aminobenzenesulphonamide and Prontosil*

Infecting dose of culture (intraperitoneally). (c.cm.)	Approx. number of organisms.	Treatment.	Number of mice out of a group of 12 injected dying on each day after infection.							Survived 3 weeks.
			1st	2nd	3rd	4th	5th	6th	6–15th	
10^{-9}	5	Controls. Untreated.	0	5	3	1	..	..	..	3
10^{-7}	500		4	7	1	..	..	..	..	0
10^{-5}	50,000		7	5	..	..	..	..	..	0
10^{-5}	50,000	*p*-aminobenzenesulphonamide 50 mg.	0	0	0	0	0	0	0	12
10^{-5}	50,000	„ 10 mg.	0	0	1	0	0	0	2	9
10^{-5}	50,000	„ 2 mg.	0	0	1	2	1	1	1	6
10^{-3}	5,000,000	„ 50 mg.	4	4	1	0	0	0	2	1
10^{-5}	50,000	Prontosil 10 mg.	2	3	2	0	0	2	0	3
10^{-5}	50,000	„ 2 mg.	0	1	4	0	0	1	4	2

The drugs were given by the mouth immediately after infection; the same doses were repeated 8 times: 7 hours, 1, 2, 3, 4, 6, 9, and 12 days after infection.

mice were not protected against strains of low virulence by the drug. J. et Mme. Trefouel, Nitti, and Bovet [7] noticed that azo-compounds which did not contain a sulphonamide group attached to one benzene nucleus were inactive, whereas the substituent groups in the other nucleus could be varied considerably without influencing the protective power; this led them to the conclusion that the animal was able to break down the compounds with the formation of *p*-aminobenzenesulphonamide. They showed that *p*-aminobenzenesulphonamide hydrochloride had an action similar to that of the azo-dye (prontosil) derived from it in protecting mice. Goissedet, Despois, Gailliot, and Mayer [8] confirmed the conclusion of J. Trefouel that the azo-linkage was not necessary for this action on streptococci; they found that benzylideneaminosulphonamides were active, also sodium *p*-aminobenzenesulphonamidemethylenebisulphite.

Experimental *

Confirming the results of Trefouel, Nitti, and Bovet, we found that the hydrochloride of *p*-aminobenzenesulphonamide has an action on infected mice which is similar to that of prontosil. The compound was found to be freely soluble in water, but the resulting solution was acid and produced a local necrosis when given by subcutaneous injection. To avoid this effect *p*-aminobenzenesulphonamide base has been used in these experiments.

The toxicities of prontosil and *p*-aminobenzenesulphonamide base and hydrochloride were compared, giving the drugs in a suspension of gum acacia by the mouth to mice of 19 to 22 g. weight.

12 mg. of prontosil was innocuous, 25 mg. killed four out of six mice, 50 mg. five out of six, and 100 mg. six out of six. With *p*-aminobenzenesulphonamide base or hydrochloride, 50 mg. was innocuous, 100 mg. killed two out of six mice, and 200 mg. six out of six. Larger doses of prontosil (50 mg.) were tolerated if given subcutaneously.

In the therapeutic experiments, the strain used was a mouse-virulent hæmolytic streptococcus obtained from a case of puerperal septicæmia ("Richards") by Dr. Colebrook; it has been repeatedly passaged through mice. The cocci were grown for six hours in a broth described by O'Meara and Brown.[9] Dilutions of the culture were made in broth so that 0·3 c.cm. could be used for each intraperitoneal injection. For a comparison between different drugs it is necessary to use mice infected at the same time, as streptococci grown under apparently identical conditions vary somewhat in virulence.

The drugs were given by the mouth immediately after infection and the doses repeated every day for three days or more; this method of administration has been found to give the maximum protective effect. In our original experiments, mentioned in THE LANCET (1935, ii., 840), when one dose only was given—as in Domagk's original experiment—a prolongation of life of about two days only was obtained.

Table I. gives a representative example of a series of these therapeutic experiments. In all of them prontosil and *p*-aminobenzenesulphonamide are equivalent in protective activity with doses of 2 mg. With larger doses the toxic action of prontosil interfered with the comparison of therapeutic efficiency. The drugs also protect when injected subcutaneously. The protection shown with *p*-aminobenzenesulphonamide is better than that obtained with prontosil. †

The efficacy of a drug for protecting against streptococcal infection can be assessed by two criteria: (1) an estimate of the number of average lethal doses of cocci against which the drug will protect when it is given to the infected mice under optimal conditions for its action; and (2) by an estimate of the latest

* G. A. H. Buttle and D. Stephenson are responsible for all the experiments on animals.

† The prontosil referred to is the hydrochloride of 2:4-diaminoazobenzine-4' sulphonamide. Prontosil soluble is a different substance—preliminary experiments indicate that it protects as well as *p*-aminobenzenesulphonamide.

TABLE II.—*Protection of Mice against Streptococcal Infection by p-Aminobenzenesulphonamide*

Infecting dose (c.cm.).	Approx. number of organisms.	Treatment.	Number of mice out of a total of 6 injected dying on each day after infection.										Survived 1 month.
			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	10–20th	
10^{-9}	5	Untreated.	1	1	1	1	0	0	0	0	0	0	2 killed.	..
10^{-7}	500		1	4	1	..	..	..	..	..	..	..	..	0
10^{-5}	50,000		4	2	..	..	..	..	..	..	..	..	..	0
10^{-5}	50,000	Treated immediately after infection.	0	0	0	0	0	0	0	1	1	0	2	2
10^{-3}	5,000,000		0	1	1	2	0	0	0	0	0	0	1	1
10^{-5}	50,000	Treated first 8 hours after infection.	1	0	0	0	1	0	0	0	0	0	0	4
10^{-5}	50,000	Treated first 19 hours after infection.	0	2	2	0	0	0	0	0	1	0	0	1

The treated mice received 20 mg. of *p*-aminobenzenesulphonamide base by the mouth; the dose was repeated 8 hours later and again every day for the first 4 days.

TABLE III.—*Protection against Different Strains of Streptococci*

Strain.	Griffith's serological type.	Dose (c.cm.).	—	Number of mice out of a total of 6 injected dying on each day after injection.											Survived 1 month.
				1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	10–20th	
"Richards."	Type 3	10^{-5}	Untreated.	4	2	0	0	0	0	0	0	0	0	0	0
			Treated.	0	0	0	1	0	0	0	1	2	1	0	1
"Williams."	„ 14	10^{-5}	Untreated.	5	1	0	0	0	0	0	0	0	0	0	0
			Treated.	0	1	0	0	0	1	1	1	0	0	1	1
"Pope."	„ 14	10^{-5}	Untreated.	1	3	1	0	0	0	1 k.	..	..	..	..	..
			Treated.	0	0	0	0	0	0	0	0	1	0	1	4
"Gillard."	„ 17	10^{-5}	Untreated.	2	3	1	0	0	0	0	0	0	0	0	0
			Treated.	0	0	0	0	0	0	0	0	0	0	2	4
C.203.	„ 1	10^{-5}	Untreated.	5	1	0	0	0	0	0	0	0	0	0	0
			Treated.	0	0	0	0	1	1	0	0	0	0	1	3
Aronson Schnitzer.	—	10^{-5}	Untreated.	2	4	0	0	0	0	0	0	0	0	0	0
			Treated.	1	3	2	0	0	0	0	0	0	0	0	0
Aronson Schnitzer.	—	10^{-6}	Untreated.	6	0	0	0	0	0	0	0	0	0	0	0
			Treated.	0	0	1	2	0	0	0	0	0	0	0	3

The treated mice had 5 mg. of *p*-aminobenzenesulphonamide subcutaneously immediately after infection; the dose was repeated 5 hours later and again every day for 6 days. k. = killed.

time after infection when administration of the drug will still be operative in saving these animals. The action of *p*-aminobenzenesulphonamide base in protecting mice inoculated with multiple fatal doses of streptococci is shown in Table II., which also shows the effect of giving the drug at different times after infection. The lethal dose of culture for untreated mice is 10^{-9} c.cm. (this dose kills 4/6 of the mice and should more properly be called the "2/3 lethal dose"). The drug will protect mice infected with 10,000 lethal doses of cocci. If a million lethal doses are used for the infection, the treated mice die at similar times to the untreated controls receiving one lethal dose. Protection can be demonstrated if the drug is given by the mouth to mice eight hours after infection; the drug protected 4 mice which had no cocci in the blood at the time of treatment, delayed for five days the death of a mouse with 500 cocci per c.cm. and failed to protect another with 3000 per c.cm. of blood.

If the drug was given 19 hours after infection, 1 out of the 6 mice were saved and the death of the the others delayed slightly.

EFFECT OF *p*-AMINOBENZENESULPHONAMIDE ON DIFFERENT STRAINS OF STREPTOCOCCI

The protective action of the drug has been tested with six different strains of virulent streptococci. The results are shown in Table III. The first four strains used in this experiment were mouse-virulent streptococci obtained from cases of puerperal sepsis by Dr. Leonard Colebrook, the last two, C.203, a scarlet fever strain, and "Aronson" (Schnitzer) strains were obtained from Dr. E. W. Todd. They are all Group A strains by the Lancefield classification, although belonging to different serological types as shown in Table III., they have all been repeatedly passaged through mice.

The puerperal strains and C.203, the scarlet fever strain, all give the same results as the "Richards" strain used for the experiment in Table I. It is evident that protection can be obtained equally well against streptococci of different serological types. Protection against the "Aronson" strain can only be obtained if a very small dose is used for the infection. Protection against a Lancefield Group B strain "Aronson" (Neufeld) has been obtained by Dr. Colebrook (personal communication): 7·5 mg. of prontosil or *p*-aminobenzenesulphonamide injected daily protected mice against 100 fatal doses of this strain.

EXPERIMENTS WITH ORGANISMS OTHER THAN STREPTOCOCCI

Experiments with *staphylococci* have so far failed to show any protection. The staphylococcal strains available will only kill mice with a very large dose, and it has already been shown that there is no protection with a large dose of a relatively avirulent streptococcus (Nitti and Bovet).[6]

Some preliminary protection experiments with mice infected with *meningococci* done in coöperation with Mr. H. Proom have given favourable results. The organisms were injected intraperitoneally in a suspension of 5 per cent. mucin as described by

TABLE IV.—*Protection of Mice against Meningococcal Infection by p-Aminobenzenesulphonamide*

No. of organisms.	Treatment.	Number of mice out of a total of 10 injected dying on each day after infection.						Survived 1 month.
		1st	2nd	3rd	4th	5th	6th	
10,000	Untreated.	5	2	0	1	0	0	2
	Treated.	0	0	2	0	0	0	8
1 million.	Untreated.	1	4	5	0	0	0	0
	Treated.	0	0	0	0	0	0	10
100 million.	Untreated.	4	6	..	..	..	..	0
	Treated.	0	2	3	0	0	0	5

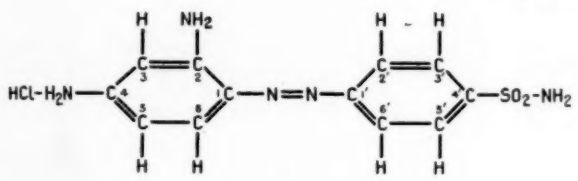
The meningococci were injected intraperitoneally in a suspension of 5 per cent. mucin. The treated mice received 5 mg. of *p*-aminobenzenesulphonamide base immediately after infection; the dose was repeated 8 hours later and again every day for the first three days.

Miller.[10] Table IV. shows that the degree of protection with one strain of meningococci (Type II.) is of the same order as that with streptococci. Protection against another strain of lower virulence was also obtained. Further work with several strains is required.

Against *pneumococcal* infection (pneumococcus Type I.) the drug has little effect; it is only just possible to demonstrate a slight effect with a very small infective dose of the cocci.

acid (cf. Stewart[11]) but this reaction was found to be not a general one. New compounds are marked with an asterisk. The preparation of 2:4-diaminoazobenzene-4′-sulphonamide (formula I.) was postulated in English Patent No. 149,428/1920, but actually described for the first time in E.P. 430,580/1935. The specimen made for the purpose of the present tests conformed in melting-point with the figure given in the patent, and had the same therapeutic action as the commercial material.

TABLE V



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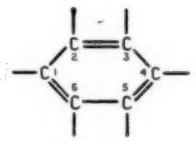

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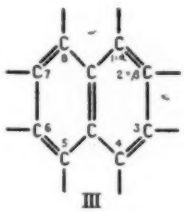

III

Group‡	No.	Name of substance.	Orientation in Formula II.	Melting-point.	Therapeutic activity.
A.	1	*p*-Aminobenzenesulphonamide.	$NH_2:SO_2\text{-}NH_2 = 1:4$.	165°	+ + +
	2	*p*-Acetylaminobenzenesulphonamide.	$NH\text{-}CO\text{-}CH_3:SO_2\text{-}NH_2 = 1:4$.	218°	+
	3	*N*-Methyl-*p*-acetylaminobenzenesulphonamide.	$N(CH_3)\text{-}CO\text{-}CH_3:SO_2\text{-}NH_2 = 1:4$.	153°	+
	4	*p*-Toluenesulphonamide.	$CH_3:SO_2\text{-}NH_2 = 1:4$.	144°	+
	5	†*p*-Sulphonamidobenzeneazodihydrocupreine.	$N_2\text{-}C_{19}H_{23}O_2N_2:SO_2\text{-}NH_2 = 1:4$.	—	+
	6*	Tropinone *bis*-sulphonamidophenylhydrazone acetate.	$N_2\text{-}C_{14}H_{11}O_4N_4S:SO_2\text{-}NH_2 = 1:4$.	210°	+
B.	7	*p*-Aminobenzenesulphonanilide.	$NH_2:SO_2\text{-}NH\text{-}C_6H_5 = 1:4$.	198°	+ + +
	8	*p*-Acetylaminobenzenesulphonanilide.	$NH\text{-}CO\text{-}CH_3:SO_2\text{-}NH\text{-}C_6H_5 = 1:4$.	214°	+
	9	Sulphanilic acid.	$NH_2:SO_2\text{-}OH = 1:4$.	—	+ +
E.	10	*m*-Aminobenzenesulphonic acid.	$NH_2:SO_2\text{-}OH = 1:3$.	—	+
			Orientation in Formula III.		
F.	11	α-Acetylaminonaphthalene-4-sulphonamide.	$NH\text{-}CO\text{-}CH_3:SO_2\text{-}NH_2 = 1:4$.	247°	+
	12	Sodium α-Naphthylamine-4-sulphonate.	$NH_2:SO_2\text{-}ONa = 1:4$.	—	+ +

† This substance has been previously described (Heidelberger and Jacobs[12]) as having an indefinite decomposition point at about 190°. The other four cinchona alkaloid derivatives mentioned in this paper behave similarly. ‡ Compare discussion.

The following had only a trace of therapeutic activity: *p*-Sulphonamidobenzeneazodihydrocupreidine,* *p*-Sulphonamidobenzeneazoapoquinine,* *p*-Sulphonamidobenzeneazo-*iso*apoquinine,* *p*-Sulphonamidobenzeneazo*iso*apoquinidine,* *p*-Toluenesulphonethylamide and Phenylhydrazine-*p*-sulphonic acid. (* = new compounds).

The following were inactive: Benzenesulphonamide, *p*-Aminoacetanilide, *p*-Hydroxybenzenesulphonamide, *p*-Chlorobenzenesulphonamide, *m*-Aminoacetanilide, *o*-Nitroacetanilide, *m*-Nitroacetanilide, *p*-Nitroacetanilide, 2:6-Dibromo-1-aminobenzene-4-sulphonamide, 1-Aminobenzene-2:4:6-trisulphonamide, *p*-Toluenesulphondiethylamide, Sodium benzenesulphonate, 4-Nitro-1-aminobenzene-2-sulphonic acid, α-Naphthalenesulphonamide, β-Naphthalenesulphonamide, α-Naphthylamine-5-sulphonic acid, Sodium β-Naphthylamine-1-sulphonate.

The drug has been tried without effect for protecting against *Trypanosoma equiperdum* in mice and against malarial infection in canaries.

Substances related to *p*-aminobenzenesulphonamide

The success attained with these simply constituted compounds naturally directed attention to the study of others more or less closely related to them, with the object of obtaining a clue to the chemical structure requisite for the development of this form of bactericidal activity. Trials of a number of readily available substances were made (Table V.).

In this Table the constitution of the substance dealt with is indicated in column 2 by the formulæ of the substituents, numbered in accordance with the orientation shown in the typical formulæ at the head of the Table. Thus, in the case of *p*-sulphonamidobenzeneazodihydrocupreine (No. 5), the $-NH_2$ group in position 1. of formula II. is replaced by the azodihydrocupreine group, $-N=N-C_{19}H_{23}O_2N_2$, the sulphonamide group in position 4 remaining unchanged.

In the preparation of some of these substances, the intermediate sulphonyl chlorides were with advantage made directly by means of chlorosulphonic

The results obtained were as follows:—

(A) *Substances in which the amino group $-NH_2$ in position 1, formula II., was modified or replaced.*—Replacement of the $-NH_2$ group by $-NH-CO-CH_3$, $-N(CH_3)-CO-CH_3$, and $-CH_3$ produces compounds with considerably less activity. A series of azo-compounds in which $-NH_2$ was replaced by $-N=NR$, where R is the dihydrocupreine, dihydrocupreidine, apoquinine, *iso*-apoquinine or *iso*apoquinidine residue, or $=N-N=R'$, where R′ is the tropinone residue, all proved to be only slightly active, as did an azo-compound in which R was the protein of mouse-serum. Replacement of the $-NH_2$ by $-H$, $-OH$, or $-Cl$, produced inactive compounds.

(B) *Substances in which the sulphonamide group in position 4, formula II., was modified.*—Substitution of $-C_6H_5$ for one of the hydrogen atoms of the sulphonamide group produced a compound (*p*-aminobenzenesulphonanilide No. 7) as active as *p*-aminobenzenesulphonamide; the acetyl derivative was less active. Sulphanilic acid, No. 9, containing the group $-SO_2-OH$ in place of $-SO_2-NH_2$, was only one-twentieth as active. Modification of either group attached to the benzene nucleus diminished or destroyed the activity, with the surprising exception of the anilide. The possibility that anilide group had some specific action of its own led us to examine *m*- and *p*-aminoacetanilide and *o*-, *m*-, and *p*-nitroacetanilide, but all of these proved to be very toxic, and showed no action in tolerated doses.

(C) *Introduction of additional substituents into the benzene nucleus, formula II.* (Footnote to Table V.).—Two

bromine atoms, in the 2 and 6 positions, gave an inactive compound. 1-Aminobenzene-2 : 4 : 6-trisulphonamide was also inactive.

(D) *p-Toluenesulphonamide derivatives, formula II.* (Footnote to Table V.).—*p*-Toluenesulphonethylamide was less active than *p*-toluenesulphonamide, and the corresponding diethyl-compound was inactive.

(E) *Sulphonic acids, formula II.*—*m*-Aminobenzenesulphonic acid was slightly active. Sulphanilic acid has been mentioned above. Phenylhydrazine-*p*-sulphonic acid had a slight activity. Benzenesulphonic acid and 4-nitro-1-aminobenzene-2-sulphonic acid were both inactive. The presence of the basic group ($-NH_2$) attached to the benzene ring appears to be more important than that of the sulphonamide group alone.

(F) *Naphthalene derivatives, formula III.*—*α*- and *β*-Naphthalenesulphonamides were both inactive; *α*-acetylaminonaphthalene-4-sulphonamide active, but not quite as good as the corresponding benzene derivative. α-Naphthylamine-4-sulphonic acid (tested as sodium salt) had the same degree of activity as sulphanilic acid, the benzene analogue. α-Naphthylamine-5-sulphonic acid and *β*-naphthylamine-1-sulphonic acid (sodium salt), on the other hand, were quite inactive.

Summary

1. *p*-Aminobenzenesulphonamide will protect mice against streptococcal infection. It has the same therapeutic activity as prontosil, but is less toxic when given by the mouth, so that it is possible to obtain better protection by giving larger doses.

2. Protection can be obtained against streptococci belonging to different serological types.

3. Some protection of mice against meningococcal infection has been demonstrated, but it has not been possible to demonstrate protection against staphylococci or pneumococci.

4. Increase in the number of sulphonamide groups attached to the benzene nucleus to three is accompanied, not by increase, but by extinction of the streptococcicidal activity.

5. The anilide of sulphanilic acid is as active as the amide.

6. Sulphanilic acid itself has a smaller, but not negligible, protective action.

7. Azo-compounds derived from *p*-aminobenzenesulphonamide and phenolic cinchona alkaloids are inferior to prontosil in this respect.

We have pleasure in acknowledging our indebtedness to Dr. T. A. Henry and Dr. Colebrook for the interest which they have taken in this work and for many helpful suggestions; to Mr. A. W. Chapman for much help in the preparation of the substances; and to Mr. N. McLaren and Miss J. Smith for assistance with the animal experiments. We have to thank Dr. Colebrook and Dr. Todd for the supply and serological typing of the strains of streptococci.

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A MACROSCOPIC AGGLUTINATION TEST IN WEIL'S DISEASE

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NONE of the methods described for the serological diagnosis of Weil's disease—Schüffner's agglutination and lysis test, Bessemans's and Gaehtgens's complement-fixation tests, and the adhesion test of Brown and Davis—is anywhere near as simple as Widal's reaction for typhoid.

The preparation of the antigen for Gaehtgens's complement-fixation test, in which a culture of leptospiræ is centrifuged and the sediment suspended in saline containing 0·3 per cent. carbolic acid, induced me to try whether a similar, definitely turbid reagent would give a *macroscopic* agglutination with antiserum.

Since carbolic acid dissolves the leptospiræ, the sediment from about 250 c.cm. of Korthof's liquid medium was suspended in 10 c.cm. of meat broth (pH 7·6) to which 0·2 per cent. of commercial formalin was added. This suspension was kept in the ice-chest and thoroughly shaken each day for a week; it was then brought to the required density by the addition of saline and 0·2 per cent. formalin.

In order to save antigen, narrow tubes were used for the reaction, of such a size that 0·25 c.cm. of dilute serum with an equal volume of leptospira suspension gave a sufficiently high column of liquid. The serum was diluted in a series of larger tubes (1 : 25, 1 : 50, 1 : 100, &c.); 0·25 c.cm. was taken from each of the dilution tubes by means of Dreyer's pipette, and introduced into the testing tubes with 0·25 c.cm. of the reagent. The series of tubes were then placed for 2 hours in a water bath at 52° C.; less satisfactory results were obtained when they were kept for 2 hours in an incubator at 37° C.

The control tube, containing 0·25 c.cm. of saline solution and 0·25 c.cm. of leptospira suspension, always showed a fine granulation, which was readily observed with a magnifying glass against a dark ground. Probably the dimensions of the leptospiræ, which are much greater than the bacteria that we are usually concerned with in agglutination tests, are responsible for this phenomenon. This condition does not interfere however in a *weak* agglutination, if the test and control tubes are compared with one another.

Sera from 26 patients positive to Schüffner's agglutination and lysis test were examined; in 20 of these cases it was also known that the complement-fixation test was positive. The sera were kept in the ice-chest without preservative, sometimes for longer than 6 months, without apparent deterioration. The macroscopic agglutination test was positive in 25 cases; the titres varied between 1 : 50 and 1 : 51,200. One serum (agglutination and lysis test positive at 1 : 1000; complement-fixation test positive at 1 : 320) gave a negative result.

Of 15 sera sent in for a Wassermann reaction, all gave negative results to this test; the smallest dilutions at which these controls were examined were 5 sera at 1 : 50 and 10 sera at 1 : 20.

Although the preparation of the suspension is a simple matter, one must not underestimate the difficulties which the cultivation of large quantities of leptospiræ can offer. Whether or not the macroscopic agglutination test will become of practical importance depends, among other things, on whether an institute provided with all the necessary equipment will be prepared to undertake the preparation of the reagent in quantity and put it at the disposal of laboratories. If such a suspension is made available, the carrying out and the reading of this macroscopical agglutination test is as simple and also as harmless as that for typhoid with Ficker's reagent.

LATE RESULTS IN THE OPERATIVE TREATMENT OF INTRACRANIAL TUMOURS

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(*Concluded from p. 1228*)

REGIONAL CLASSIFICATION OF THE RESULTS

So far the results have been considered according to the pathological type of the lesion without taking into account its site. Certain types of tumour tend to favour particular sites of origin, yet in most instances their predilection for such sites is not constant enough to be reliable for prognosis. With a clinical syndrome of tumour in the cerebello-pontine angle the probability is very great that the tumour will prove to be an acoustic neurinoma, and reasonable certainty can indeed be attained by thorough differential diagnosis which includes examination of the protein content of the cerebro-spinal fluid. With an intracerebellar tumour the chances are about equal that it will be a benign astrocytoma or a malignant medulloblastoma, but there are many other, though less likely, possibilities: ependymoma, papilloma, metastatic tumour, dermoid cyst, and so forth. It will be useful, therefore, to consider broadly the relation to prognosis of the site of the tumour.

Table VII.—*Regional Classification*

—	Total.	Living 7–9 years after operation.	Useful life.	Useful survival per-centage.
Frontal	25	11	9	36
Central and paracentral ..	24	2	..	..
Temporal	15	1	..	..
Parietal	13	4	3	23
Occipital	6	3	2	33
Pituitary	30	19	10	33
Juxtapituitary	7	3	2	28
Lateral ventricle	1	1	..	..
Cerebellar	23	10	9	39
Extracerebellar	13	9	2	15
Total	157	63	37	..

Percentage of the 135 who survived operation still leading useful lives = 27·4.
Percentage of the 157 patients treated still leading useful lives = 23·5.

Table VII. shows the results classified on a regional basis. Partly because a more rigid definition of the categories is impracticable, and partly because the number of cases included is small, the Table is not of great significance. The total number of tumours for each region is given in the first column, and in the second the number of patients who were still alive 7–9 years after operation. The central, paracentral, temporal, and, to a less extent, the parietal regions are clearly unfavourable regions, because it is in these that malignant gliomas and metastatic tumours abound; a conclusion contrary to that of earlier writers (Gowers [12]). Intracerebellar tumours are on the whole the most favourable tumours of all.

RESULTS ACCORDING TO AGE

Table VIII. shows the results according to age. The number of cases is small, but as in Cushing's analysis [5] of over a thousand cases, the highest incidence of brain tumours is in the fourth and fifth decades. The percentage of survivors is greatest in the third decade, and only slightly less in the second, fourth, fifth, sixth, and seventh decades. In the first decade the survival percentage is very low, but in view of the usual frequency of cerebellar astrocytoma in the first ten years of life it is quite likely that another series might show a very satisfactory survival percentage in this period. With the reservation that this is a very small number of cases, and perhaps to some extent selected, it may be concluded that, for intracranial tumours as a whole, age has no great bearing on prognosis until the eighth decade is reached.

If inquiry is made into the types of tumour in the survivors it is found that certain types preponderate among the survivors in different decades; glioma is the common tumour in the survivors of the second decade, pituitary adenoma in the fourth decade, meningioma in the fifth decade, and meningioma and acoustic tumour in the sixth decade. These differences depend mainly on the varying frequency of benign types of tumour at different ages. Among the 44 survivors who were over thirty years old when they came for treatment there is only 1 case of glioma.

The fact that a patient is over fifty, or even over sixty, when he comes for operation is evidently no bar to survival, and it is important to note that out of the 25 patients who presented themselves for treatment when they were already over fifty 12 were still alive when last heard from 7–9 years after operation. These comprised 5 meningiomas, 4 acoustic neurinomas, 2 pituitary adenomas, and 1 blood-vessel tumour.

GENERAL SURVEY OF RESULTS

Table VII. shows the combined results as regards useful life. In the third column is given the number of survivors who were living a useful life when last heard from. This column has not been difficult to compile. It includes those free from all symptoms and those who are able to work though suffering from symptoms. Information on this point was reasonably accurate in all cases. There are 37 useful survivors from among the 157 patients operated on 7–9 years before. This gives a useful survival-rate of 23·5 per cent.; or, if we consider only the 135 patients who survived the dangers of operation, a useful survival-rate of 27·4 per cent. Thus, for patients with verified intracranial tumours undergoing operative treatment in the clinic in 1926–27 the chances of useful survival for a period of 7–9 years were roughly one in four.

Of the whole series of 157 cases, as can be seen from Table III., 14 per cent. died within a few weeks of operation; a further 12·7 per cent. after leaving hospital died in the first year; 12·1 per cent. died in the second year, while in the third year the percentage dropped to 5·1 and remained thereafter low. At the end of 7–9 years 40 per cent. were alive and 23·5 per cent. were living a useful life. There is some evidence that the incidence of benign tumour in this series is greater than would be found in a series of unselected tumours. This is elaborated in the full report on this inquiry.

These results are for the most part not so good as those obtained with tumours affecting other parts of the body. In a large series of histologically verified cases of carcinoma of the breast Lane-Claypon [14] found about 25 per cent. (206 out of 818) alive ten years after operation. For carcinoma of the cervix uteri the survival percentage ten years after abdominal hysterectomy was 36·6 (Lane-Claypon and McCullagh [15]). For three- or five-year periods the results of operation or radium treatment of carcinoma

TABLE VIII.—PROGNOSIS IN RELATION TO AGE

The Table is Based on the Age of Each Patient at the Time of his First Operation

Age in years.	Total cases.	Dead.												Living 7–9 years.
		Post-op.	0–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–14	
0–10	11	4	1	4	..	..	1	..	..	..	..	..	..	1
10–20	17	2	1	5	..	..	..	..	..	..	..	1	1	7
20–30	22	4	1	3	..	1	1	..	..	..	..	1	..	11
30–40	39	4	2	2	5	1	4	1	..	1	..	..	1	18
40–50	37	2	9	5	1	1	..	2	1	..	2	..	..	14
50–60	22	5	4	..	1	..	2	..	..	1	..	..	..	9
60–70	8	1	2	..	1	..	1	..	..	..	..	..	..	3
70–80	1	..	..	..	..	..	..	1	..	..	..	..	..	..
Totals ..	157	22	20	19	8	3	9	4	1	2	2	2	2	63

of the lip, tongue, and rectum are still better. But for all these lesions there is always a preliminary sorting before surgical treatment is undertaken; the tumour can be felt and usually seen, and in certain cases examination will show that it is not radically operable. With intracranial tumours there is no easy way of rejecting the tumours that are unfavourable for radical treatment.

Intracranial tumours as a group are in some respects more favourable than the lesions mentioned above, since they include benign as well as malignant tumours. No true comparisons can be made, but from these considerations it is clear that the practical results of intracranial surgery to-day are not so very far behind those obtained in other fields of neoplastic surgery, notwithstanding its inherently greater difficulties and comparatively recent development. With development of technical and clinical knowledge and with more selection the late results for intracranial tumour are likely to improve still further, though it will always be necessary to bear in mind that the condition of patients at the end of a post-operative period of ten years or so is not the sole criterion of the value of operation. There will probably always be some use for palliative operations which can give temporary respite.

RESULTS COMPARED WITH OTHER SERIES OF INTRACRANIAL TUMOURS

Very little material is available for comparing the results of this series with those of other series. There is first the study of van Wagenen [23] in 1932 of the 149 cases treated in Dr. Cushing's clinic in 1924–25 (Table IX.). van Wagenen has estimated the survival and useful survival periods of his cases in average figures for each pathological group, and has not discussed the usefulness of all the survivors. Consequently it is not possible to tabulate his material for close comparison with the present series, but Table IX. gives some of his results and these may be compared with certain items in Tables III. and VII.

In van Wagenen's year the survival-rate 7–8 years after operation was 34·9 per cent. as compared with 40·1 per cent. of the present series. In his year there were more gliomas and fewer meningiomas than in 1926–27, but the balance was probably favourable to the year 1924–25, since there were 11 cerebellar astrocytomas as compared with 4 in 1926–27. Such an important difference in the incidence of one variety of tumour from year to year throws doubt on the significance of any conclusions that might be drawn from comparing the results of the two years. The number of cases is too small. But the results on the whole are probably better in the 1926–27 group, though it may be noted that the useful survival of the acoustic neurinoma appears to have been much better in his series than in this one. In the two series the results in the malignant gliomas and metastatic tumours are, without exception, similar.

A more useful comparison can be made with the series of cases studied by H. M. Tooth at the National Hospital, Queen-square, between the years 1902 and 1911. Tooth's papers on this work [20 21] have probably not been given the attention they deserve. They are clearly documents of the first importance in the history of brain surgery, and at the time when they were published evidently constituted a valuable and sincere endeavour on the part of a neurologist to point the way for further improvements in surgical treatment of intracranial tumours.

Tooth analysed 500 cases of practically certain intracranial tumour which had come under observation at the National Hospital during the years 1902–11, and of these slightly less than half were histologically verified. His papers contain many valuable observations on different varieties of brain tumour.

TABLE IX.—*van Wagenen's Series*, 1924–25

Type.	Total.	Dead.	Untraced.	Living.
Glioma	80	68	..	12
Pituitary adenoma ..	26	3	1	22
Meningioma	16	8	..	8
Neurinoma	11	4	..	7
Craniopharyngioma ..	6	5	..	1
Blood-vessel tumour ..	4	3	..	1
Metastatic tumour ..	4	4	..	..
Miscellaneous ..	2	1	..	1
Total	149	96	1	52

Survival percentage = 34·9.

Table X. has been compiled from Tooth's material [21] for comparison with the present series. It comprises those tumours histologically verified by operation or necropsy in which the late result was known. The results are not strictly comparable with those of the present series for various reasons, but especially because it was not found possible by Tooth to subdivide the gliomas, and because the fate of the survivors was sometimes not known beyond a period of nine months. But comparison of the tables shows clearly that a tremendous reduction in post-operative mortality has been effected in the twenty-five years

TABLE X.—TOOTH'S SERIES, 1902–11

Type.	Total.	Dead.									Living.
		0–$\frac{1}{12}$	$\frac{1}{12}$–1	1–2	2–3	3–4	4–5	5–6	6–7	7–9	
Glioma	92	39	31	8	4	2	..	..	..	..	8
Endothelioma	30	10	4	..	1	..	1	..	1	..	13
Extracerebellar fibroma and fibroglioma	27	17	5	..	..	..	..	..	..	..	5
Sarcoma	15	10	4	1	..	..	..	..	..	..	..
Carcinoma	7	3	4	..	..	..	..	..	..	..	..
Tuberculoma	5	1	3	..	..	..	..	..	..	..	1
Cyst	5	2	..	..	..	..	..	..	..	..	3
Pituitary tumour	4	1	1	..	..	1	..	..	..	1	..
Cholesteatoma	2	..	1	..	..	..	..	..	..	..	1
Totals	187	83	53	9	5	3	1	..	1	1	31

Tooth [21] in 1913 reported 265 cases in which operation had been done for intracranial tumour between 1902 and 1911 inclusive. In 78 cases either the tumour was not verified or the condition of the patient on discharge from hospital was not known. In the remaining 187 cases the tumour was verified at operation or necropsy, and the late result of the operation was known in the cases of the survivors for periods varying between 9 months and 9¼ years. The fate of these 187 patients is set out in the above Table. Pineal tumours and papillomas of the choroid plexuses have been included with gliomas. The remainder are placed in the pathological groups in which they were originally described, extracerebellar fibrogliomas and fibromas being grouped together. From study of the protocols it is probable that many cases classed as sarcoma would at present be regarded as gliomas.

The deaths after operation were classified by Tooth according as the patient lived hours, days, months, or years. In this Table all those dying within the first month have been grouped together, as have all those dying between the second and twelfth months. This interferes with the chance of working out accurately the operative mortality, but in some cases that would have been impossible from the information available. Certainly the operative mortality was greater than 44 per cent. (83 deaths in 187 cases), for a number of the patients in the second column of the dead died in the hospital. Reference to the condition of the living is given in the text.

This method of dealing with the material takes no account of the unverified tumour cases and 32 such patients were living when last heard of. However, perusal of the protocols shows that most of them were in poor condition; only a possible 9 were able to do any work. In this present report the series of unverified intracranial tumours for 1926–27 has not been analysed or discussed because it does not provide information of any help in establishing the prognosis of tumours actually verified and pathologically classified.

that separate the two series, a reduction from over 50 per cent. to 14 per cent. and the survival-rate has greatly increased, from 16 to 40 per cent. The incidence in the operating theatre of benign tumours, such as pituitary tumours and to a less extent meningiomas, has considerably increased, and this fact favours the survival-rate of the later series. But this is balanced by the fact that the survivors of Tooth's series were incompletely traced; only 10 of the 31 survivors had been traced for as long a period as the survivors in the 1926–27 series. Of these, 4 were endotheliomas, 2 were cerebellar gliomas, 3 were cerebellar cysts, and 1 was an extracerebellar fibroma. Of the 31 survivors 14 were able to do some work at the time when they were last heard of.

Advances in surgical technique have doubtless played the major part in this improvement, but not a little must be attributed also to increased accuracy of diagnosis. Thus we find in Tooth's series that in 9 out of 44 verified frontal tumours exploration was made in the cerebellar region or over the wrong cerebral hemisphere. For the gliomas as a group exploration was in the right place in 76 cases and in the wrong place in 17 cases; while in the endotheliomas (meningiomas) exploration was in the right place in 29 cases and in the wrong place in only 4 cases. It is impossible not to admire the accuracy of diagnosis in meningiomas based as it can only have been on the most skilful interpretation of symptoms and signs, often of an inconspicuous or "false localising" character, and without the help of X rays, ventriculography, and other methods that have since proved so fruitful. In the year 1926–27 exploration was made in the wrong place in only 3 cases.

Sepsis also claimed a larger number of fatalities in Tooth's series than in the 1926–27 series, though it would give a false impression to imply that this complication of intracranial operations has been entirely eliminated.

Comparison of the two series shows that the outstanding improvement in the second lies in the immediate post-operative mortality which has, of course, a considerable effect on the survival and useful survival-rate. It is not possible to measure the increase of longevity that may have resulted from other causes, such as more radical and effective treatment of the tumour.

The earliest literature on the results of surgical treatment of intracranial tumours affords no material for comparison with this series since it was, naturally enough, concerned almost exclusively with the immediate post-operative results; or, when late results were reported, the series of cases was too small to be of any statistical significance. It is fairly clear, however, that the number of useful survivors must have been very small. Thus in 1910 Byrom Bramwell [2] wrote, from a very wide experience, "In only two cases of intracranial tumour which have come under my notice in which an operation has been performed has complete cure resulted." Successes were expected by Starr [19] and by Gowers [12] chiefly in superficial tumours about the fissures of Rolando and Sylvius, tumours which are now found to comprise a rather unfavourable group, because in this situation such a high proportion of them are malignant; Starr and other writers of his time constantly refer to the high mortality of cerebellar explorations and to the inaccessibility of that region. The more recent observations of my series and of van Wagenen's series show that cerebellar tumours are on the whole by far the most likely to give lasting good results.

So much depends on accurate diagnosis and the safety of surgical access. It may well be found in ten years' time that the most favourable cases from the point of view of lasting useful survival are certain tumours of the third ventricle. Indeed, a growing number of observations already point in that direction.

CONCLUSION

It will be clear that I have been afforded the privilege of examining freely and critically the results of my former teacher, Dr. Harvey Cushing, and it is my earnest hope that I have done justice to this small section of what must be called his

epochal work. His cases have been accurately documented in pursuance of a far-sighted design, and the records are available in the Brain Tumour Registry at New Haven for such examinations as the future may indicate to be desirable. It is to be hoped that further inquiries of this nature may be made by others of Dr. Cushing's former assistants, so that before many years there will be added to the initial studies of van Wagenen and myself a greater and statistically more significant volume of knowledge on the late results of treatment of intracranial tumours. That such unrestricted studies of one man's work by his pupils are possible indicates to some extent the sense of partnership with which Dr. Cushing has invested his clinic, a quality that is the mark of all great teachers.

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ŒSTRIN TREATMENT OF CYSTIC DISEASE OF THE BREAST

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THE conservative management of cystic mastopathia finds a new basis in recent observations on the favourable influence of œstrin. Under this treatment the symptoms either disappear or are considerably relieved, and examination shows that the signs are diminished or almost absent, the results being especially good in early cases. The brownish or greenish discharge becomes serous and either decreases or stops. Cutler,[1] Gabrielianz,[2] and Taylor[3] have reported equally satisfactory experience of the œstrin treatment of mazoplasia and mastodynia.

During the year 1935 we have treated 22 cases of cystic mastopathia with œstrin and have obtained considerable recovery in 18. In 2 patients, both between twenty and thirty, the local and general condition was aggravated; and in 2 cases there was no effect. In older persons—i.e., in the middle forties—œstrin treatment will sometimes do harm, presumably because the patient, just before the menopause, is already suffering from a relative excess of œstrin; and the worsening of the general condition of the two patients under thirty resembled that usually observed in the middle forties, with flushes, sweating, anxiety, and especially dizziness.

In the light of our present experience we should advise a dosage of 2000–4000 mouse-units daily by mouth or 10,000–20,000 m.u. once a week intragluteally. The course of treatment should last 3–6 months and in some cases should be continued longer, with pauses. The idea that the remedy is more than symptomatic is supported by the evidence of biopsy in the case described below. The treatment seems applicable especially to cystic mastopathia in young women, in the hope of avoiding operation. Surgery should be regarded as inadvisable unless œstrin proves of no avail or there is some doubtful change in the clinical picture. On the other hand, the conservative treatment necessitates close and continuous observation of the patient. The affected breast should be supported but on no account compressed.

We also try conservative treatment in older persons, but if it does not help we have less disinclination to operate, particularly if there is any suspicion of papillomata in the lactic ducts, or of early carcinoma. With older patients conservative treatment demands even closer and more continuous supervision. If operation is decided upon partial extirpation finds favour if the process is clinically localised; for experience shows that as a rule the condition does not recur, for many years at least. But partial operation likewise carries the necessity for careful observation. Where the changes are diffuse, partial extirpation is of course unwise and the best plan is ablatio mammæ, with possible retention of skin, areola, and papilla. Whatever operation is adopted microscopical examination is essential, so that a radical removal may be performed if need be.

As an example of considerable recovery after œstrin treatment the following case may be quoted.

The patient was 49 and had had two children, the second being 15 years old. The menopause had taken place nearly eight years ago, menstruation having previously been normal. On and off for the past two years she had had stabbing pains in both breasts, and had been able to squeeze a dark, greenish, slimy liquid out of the papillæ. Examination three months ago showed that the whole right breast was of firmer consistency than is normal, and full of numerous small lumps. A greenish, slimy liquid could be pressed out of the papillæ from all quadrants. In the left breast there were corresponding changes in the two upper quadrants, and the process also extended a little way down into the two lower ones. The same sort of secretion as in the right breast could be pressed out of the papillæ from the affected regions. Both breasts were slightly tender. The axillary glands were not swollen. Examination of the internal genital organs revealed no abnormalities.

After the patient had taken 86,000 m.u. of œstrin by mouth (3000 daily) there was considerable improvement. The stabbing pains were now less frequent and comparatively slight. The affected parts of the corpora mammæ were softer and less tender, the small lumps were either not palpable, or only to be felt indistinctly in a few places. The discharge, which was now nearly serous, could be pressed out of only a few lactic ducts. In a limited region in the upper lateral quadrant of the left breast, however, the improvement was less pronounced than in the other parts, and in view of the patient's age a portion was excised under local anæsthesia. The histological picture was not characteristic, being suggestive of the regressive processes seen in a breast that has been subjected to energetic X ray treatment, or simply those observed at the menopause. There was a cellular reaction round the lactic ducts and this, in association with the characteristic pale epithelium and the presence of numerous glandular tubes without corresponding acini, speaks of regressive changes. The breast had evidently been the seat of abnormal development of the glandular tubes such as we see in benign cystic disease. There was no indication of malignancy.

We continued the œstrin, this time as a weekly dose of 20,000 m.u. intergluteally. After another 100,000 m.u.

[1] Cutler, M.: Jour. Amer. Med. Assoc., 1931, xcvi., 1201; 1932, xcix., 2152; 1933, ci., 1217. Ann. of Surg., 1931, xciii., 223. Surg., Gyn., and Obst., 1929, xlviii., 463. Amer. Jour. Obst. and Gyn., 1933, xxv., 504.

[2] Gabrielianz, A. G.: Amer. Jour. Obst. and Gyn., 1933, xxv., 499.

[3] Taylor, H. C., Jr.: Arch. of Surg., 1930, xxi., 42; Surg., Gyn., and Obst., 1933, lvii., 627.

had been given in this way we stopped the treatment and found both breasts soft, of almost normal consistency. The small lumps were no longer palpable. When the right breast was squeezed hard it was possible to press a little greenish discharge out of one of the lactic ducts, and from another one a little serous fluid. In the left breast a little serous liquid could be obtained from a single lactic duct, but only after firm pressure. The tenderness had disappeared. Eight months after ending the œstrin treatment the condition remains the same.

It will be observed that in this case of bilateral cystic mastopathia excellent results followed administration of œstrin (86,000 m.u. by mouth and 100,000 by injection). As already stated we are able to record a considerable degree of improvement in 18 of 22 cases in which œstrin has been used.

THE EVIDENCE OF A BULLET WOUND
SELF-DEFENCE OR MURDER?

BY G. R. OSBORN, M.B. Melb.

FORMERLY MEDICAL OFFICER IN CHARGE OF THE COMMONWEALTH HEALTH LABORATORY AT KALGOORLIE, AUSTRALIA

THE deductions drawn from injuries caused by bullets may be of great importance in the law courts, and medical men who may have to give evidence about such injuries should be familiar with their characteristics. This was brought home to me by the following case.

THE STORY

Z. is a Jugo-Slav employed as a miner on the Kalgoorlie goldfields; he is happily married and has three small sons. L. was a Montenegrin, also a miner, and the two men were formerly good friends. The friendship broke off when L.'s infatuation for Mrs. Z. became obvious, and he was warned to keep away from the house.

A few days before the shooting he sent a message to Mrs. Z. saying that he would go to see her at 9 P.M. on Monday (at a time when Z. would be at work in the mine). Mrs. Z. gave the message to her husband, who decided, he said, to give L. a bad fright. He borrowed a 0·44 Winchester rifle from his butcher, "to shoot a mad cat" and bought a few bullets from the local store. These bullets are made of lead without a hard jacket and carry a heavy charge of black powder; they are of the type used for shooting kangaroos. He took the rifle home and hid it under a bed in the front bedroom. He took no lawful steps to have L. restrained.

On the Monday afternoon Z. went to work as usual, but at 8 P.M. he pretended he was ill, was brought to the surface and went home. Reference to the plan of his house (Fig. 1) is necessary to follow the events which then took place. He found his wife sitting (at the place marked z^1) sewing in the living-room by a long table. He told her not to worry and went into the front bedroom where his boys were sleeping. He then loaded the rifle and waited in the dark for the arrival of L. At the appointed time L. entered by the back door and walked up to the spot marked L beside Mrs. Z. He put his arms around her and started making love to her. When Z. heard this he rushed out of the bedroom to the spot Z, and, holding the rifle with the butt under his elbow and the barrel pointing upwards, called out "Hands up, hands up!" L. was then shot dead. Z. did not move from the point Z, and was still there when his brother-in-law returned with the police.

Z.'s story of the shooting was that when he called out to L. the latter lunged at him with his right hand while thrusting his left towards an inside coat pocket—a movement which Z. decided was to get a revolver. Actually the police found a fully loaded revolver in this pocket. Z. said that he then realised that if he did not shoot he would himself be killed, and so he fired. He estimated that the distance from the muzzle of his rifle to L.'s head would be three or four feet. He said that L. fell straight backwards on to the floor, where he was found on his back with his feet towards Z. and that he did not move or utter a sound.

When the police arrived they found Z. standing at the point marked Z; Mrs. Z. in the bedroom quietening the three boys; and the body stretched out as described. Around the right side of the head there was a rather large pool of blood which was virtually part of a pool of blood and brain matter on the table (see Figure). At a point marked B, near the kitchen door, was found a fragment of bullet, which had evidently had no velocity when it reached this spot, for there were no marks on the soft wall. The walls were of paper over hessian, and it would not be possible for the bullet to rebound from them.

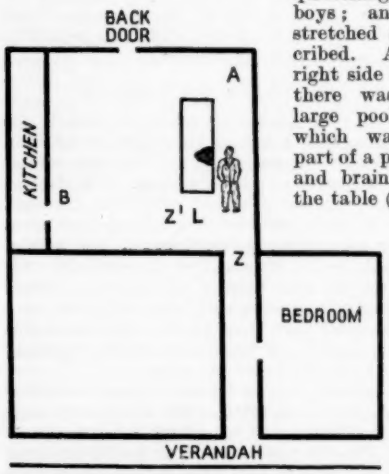

FIG. 1.—Diagram of scene of shooting. Z marks position of Z. when shooting L. z^1 shows position of Mrs. Z. and L that of L. beside her. B shows where a fragment of the bullet was found, and A shows theoretical position if victim was shot from behind. The position of the body and blood stains on the table are indicated.

THE POST-MORTEM FINDINGS AND THE CONCLUSIONS DRAWN FROM THEM

On post-mortem examination a large gaping wound was found just behind external angle of the right eye, about 2 in. in diameter (Fig. 2). There was no bone in this hole and the brain substance, much macerated, could be seen through it. Behind this wound and immediately above the right ear was another hole, which was not ragged, but clean-cut; it admitted only the little finger and also communicated into the brain substance. No scorching or blackening was detected. On dissection the bones of the skull were found to be extensively fractured on the right side. The brain substance was also macerated very extensively on the right side and much of it was missing. In its substance were many fragments of small bone, and two pellets of lead were extracted.

From these findings the examiner drew the following conclusions:—

It is my opinion that the damage was caused primarily by a leaden bullet which had entered the head through a clean, well-defined hole above the right ear, smashing the bone there in radiating fractures, entering the brain substance, part of it remaining, and another portion escaping through the ragged tear in the soft tissues at the outer corner of the orbital cavity and that instantaneous death was the result.

This conclusion was presumably based on the belief, which is widely held, that bullets make a small wound on entry and a large one on exit. It gave

overwhelming support to the Crown's contention that Z. was lying and that he had shot L. from the back—in other words, that he was guilty of premeditated murder. The judge was quite emphatic that if the victim was shot from the front it could be self-defence—which was the plea advanced—but if he was shot from the back then the defence must fail and the jury could only bring in a verdict of wilful murder. The conclusion as to position drawn by the Crown medical witness accordingly became the central point of the trial. In fact there was virtually nothing else in dispute.

RECONSIDERATION OF THE EVIDENCE

Z. had been well known to me as a patient for over two years, and I had a high opinion of him. I was accordingly impressed by his absolute refusal to alter his account of the shooting. His lawyer told him that falsehoods would prejudice his case, and that the Crown was sure that L. was shot from the back; he suggested that perhaps L. had turned his head away as he fired. But Z. replied: "If I am to hang for it I cannot say anything else." We accordingly reinvestigated the evidence and I came to the conclusion that the Crown witness was wrong in supposing that the small wound is necessarily the one by which the bullet entered.

This idea, I found, is in fact based on the behaviour of hard (e.g., nickel-jacketed) rifle bullets of high velocity (over 2300 ft. per sec.) fired at a range of round about 200–800 yards, and it is not in the least applicable to soft lead bullets fired with a low muzzle velocity or at short range. Even the hard rifle bullet, at less than 200 yards, will probably cause a large ragged hole—(1) because of the terrific force of impact, virtually causing an explosion, and (2) because it is pointed, not truly cylindrical, and therefore "wobbles" in the early part of its flight, before being steadied by wind-resistance.

Hence, contrary to the general belief, a large entrance wound is the rule with rifle bullets fired at close range; and during the late war such wounds often gave rise to unfounded accusations that the enemy was using dum-dum bullets—i.e., bullets whose point has been removed in order that they shall flatten out instead of penetrating. (It is difficult to see that warfare is any less horrible when waged with nickel bullets.)

In the case before us, however, the bullets were of soft lead, unjacketed, and fired at very short range from a rifle with a muzzle velocity of about 1300 ft. per second. As soon as such bullets strike the body they "mushroom out," like dum-dums, and thereby cause great destruction of tissues. The result is that the entrance wound will probably be much bigger than the exit wound—if indeed there is an exit. If the soft bullet also has a wobble, which is likely if it is fired at close range, it is almost impossible for it to make a clean-cut entrance wound. This fact can readily be applied to the present case.

Referring once more to Fig. 2, the small clean-cut wound was at a point G over the right ear, and the large wound was 2 in. in diameter with its centre at D. G–D is approximately 2½ in.; for the first 1½ in. the skull is in place though extensively fractured, while the last inch has neither skull nor scalp. To cause a large circular hole the bullet must have struck the skull at, or slightly proximal to, the mid-point D, and approximately perpendicularly to the surface. If G is the entrance wound then D must have been struck from about the centre of the brain and emerged in the direction D–J which leads to a point A in the room (Fig. 1) where the bullet was not found. The absurdity of a course such as G–K–D–J is at once obvious, for there is nothing in the brain to deflect a bullet. If the bullet entered the brain at G then the nearest it could possibly get to D would be about the centre of the forehead along a path such as G–K–E; much more probably it would have struck the skull again on the left side. Accordingly we can say it is impossible for D to have been struck from within the skull. There is however one other course which can be made out with G the entrance—i.e., G–C–H—which would leave the bullet nearer the back door but still a long way from B near the kitchen door. If the bullet did not at once enter the brain at G but tracked between the skull and scalp it would tend to take the course G–C–H which is ¾ in. away from D at its nearest point, and a course G–C–D is absurd.

By anatomical considerations we are forced to conclude that G cannot be the wound of entrance. This conclusion is strengthened by the fact that, though only one of three pieces of the bullet emerged from the head, the bone substance was driven into

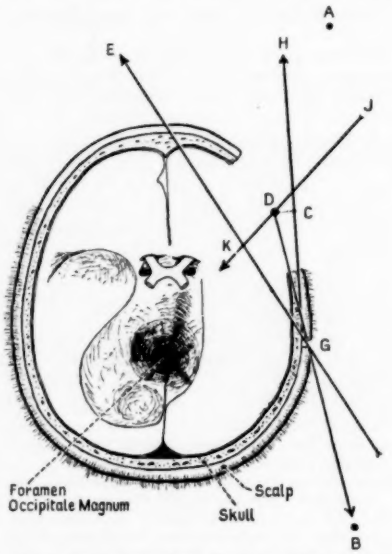

FIG. 2.—Diagram showing head injuries of the dead man and possible courses of the bullet. For explanation of letters see text.

the brain and the loss of bone substance is from the anterior wound. A soft bullet has lost most of its energy when it mushrooms out, and a third of a spent bullet could not have caused the extensive injuries found anteriorly.

If on the other hand we examine the wounds as Z. said they were inflicted their anatomical explanation is simplicity itself.

If the bullet were fired in a direction such as J–D it would cause a large wound of entrance such as was found with its centre D. As soon as it hit the head it would mushroom out and burst into the three pieces in which it was found. Two of these three pieces continued on into the brain and were found there—i.e., their force was largely spent. The third piece of bullet was guided by the skull around between the scalp and bone in the direction D–G, in which plane it would not meet with any resistance until it reached the place where the skull and scalp turn medially towards the occiput. This place is, of course, over the ear, where the small round hole was found, and the course J–D–G leads directly to the point B near the kitchen door where the fragment of bullet was actually discovered.

No burning or powder marks were found around the wounds. The likelihood of such marks being present when the victim is shot from a short distance

depends primarily on the type of powder used. With cordite for example there is almost complete combustion in the firearm and no powder marks will be found, even at a distance of a few feet. With black powder, on the other hand, such as was used by Z., it is the rule to get powder marking at a considerable distance—e.g., 20 ft. or more. Hence in our case, with a range of only about 4 ft., if the small posterior wound was really the entrance a heavy black powder marking might certainly have been expected round it. If on the other hand the large anterior wound was the entrance the reason for its absence is obvious. At this short range the dispersion of the powder would be less than half the diameter of the part of the scalp and skull blown out, so that it must have been blown off also. Accordingly the evidence of the powder marking strongly supports Z.'s story.

We can also argue the position of the victim from the position of the body and blood stains on the table and floor.

Concussion is a hyperacute cerebral compression; it is manifested clinically by an instantaneous paralysis of the entire body and all its functions. Although people who are shot through the body may twist around in a great variety of ways before dropping down, those who have an injury which causes concussion always fall straight down limply. The injuries which L. received would cause instantaneous concussion and death, and he should fall as Z. said he did—straight back to where he was found without any movement at all. Had he fallen in this way it is clear that the right side of his head would have been towards the table as he fell, and the reactionary force would cause the blood and soft brain matter to fly out on to the table as the head fell past it, and then to form the pool on the floor to the right side of the head which was virtually part of the pool on the table. Had he been shot from behind the blood would have shot in the opposite direction—away from the table, and the body should have been on its face. The explanation offered was that the body fell on to the kitchen side of the table, lay there for a while and then rolled over to the position in which it was found. This is a most unlikely course, however, because the natural tendency would be to fall to the kitchen side of the table, and in any case it does not fit the facts nearly as readily as the simple description given by Z.

The jury returned a verdict of "not guilty" and Z. was discharged. The verdict was very popular, but it was clear that the life of the accused rested almost entirely on a medical argument.

EVIDENCE WHICH WAS OVERLOOKED

Details were submitted to Prof. Sydney Smith of Edinburgh for his criticism, and I wish to record my appreciation of his kindness in allowing me to quote the following passage from his letter:—

FIG. 3.—Bevelling of skull in line of fire.

"There are one or two points which are of extreme importance which have not been described—namely, the examination of the wounds in the skull bone gave no indication about bevelling. This is most important for it is almost invariable that the bone bevels in the direction of fire, and in the clean-cut hole which was found posteriorly, bevelling on either the inside or the outside was almost certain to be present, and if it were present, if it were on the outer table, it would indicate that the posterior wound was the outlet wound of the bullet; whereas if the bevelling were on the inner table it would indicate that it was the entrance wound (Fig. 3). It would be more difficult perhaps to see whether there was any bevelling in the anterior wound, but if the fragments had been carefully collected and the skull reconstructed, it should have been possible to make this observation also.

"Secondly, no information is given about the amount of bone fragments that were found in the brain. The post-mortem report says in its substance were "many fragments of small bone pieces," and the question arises whether the number of fragments were more than could be accounted for by the loss of substance of bone in the posterior wound. If the number was greater, then they must have been driven into the skull from the anterior wound, for obviously if it were the exit wound, all bone fragments would be blown outside the skull.

"Thirdly, there is no evidence in the report to show where the fragments of bullet were found. This might also be helpful in fixing the line of fire."

SUMMARY

This is a case in which justice nearly miscarried through misinterpretation of post-mortem findings. It was wrongly supposed that bullets necessarily cause a small clean-cut wound at entry and a large irregular wound at exit. This is usually true of jacketed bullets fired from rifles with a high muzzle velocity (over 2100 ft. per second) at a range of 200–800 yards; but the same bullets encountered at shorter range, or soft bullets, or bullets fired from firearms with a lower muzzle velocity, may have the opposite effect, and the entry wound may be larger than the exit.

When black powder has been used powder marking may be expected up to a range of 20 ft. or more, and this may help to confirm anatomical deductions about the line of fire. Such deductions should be founded on very careful examination, bearing in mind the details of fundamental importance.

LEBANON HOSPITAL FOR MENTAL DISEASES, SYRIA. Sir Hubert Bond presided at the thirty-seventh annual meeting of this hospital held at Friends House on May 18th, and presented the report of the medical director, Dr. Stewart Miller. There had been a record number of 556 patients under treatment during the year, and the chairman commented on the surprising proportion of admissions (239) to the number of beds (370). As in England, the largest group of patients was of the schizophrenic reaction type (90 cases), the next largest being the more hopeful group with recurrent phases of excitement or depression (42 cases); 57 patients had been discharged during the year recovered, 69 improved, 18 not improved, 3 not insane. Of the 147 discharged, 75 had been there for less than three months, and all but 26 for under one year. The large proportion of early cases might be accounted for by the absence of certification in Syria. Dr. E. W. G. Masterman, chairman of the general committee, said that the work requiring doing at their own door was sufficient to warrant the erection of another hospital of equal size, if funds were forthcoming. They had decided: (1) to expand the hospital up to 500 beds; (2) to deal with borderland cases in a branch convalescent home in the Lebanon. A hundred new beds had been added during the last 18 months; there were now 12 houses, and the unit was considered a model for the country. Patients came for treatment from Egypt and other neighbouring countries. The director's position as lecturer at the University of Beirut on mental and nervous disorders brought him in touch with the fifth-year students who were the future practitioners of the Near East. The hospital stood in a key position there, and its influence as a healing centre amidst political strife was one of its brightest features. The new report will be sent on application to the secretary, Lebanon Hospital Committee, Drayton House, Gordon-street, London, W.C.1.

MEDICAL SOCIETIES

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

A MEETING of this society was held on May 21st at Manson House, with Sir ARTHUR BAGSHAWE, the president, in the chair. The subject for discussion was

Intestinal Absorption in the Steatorrhœas

Dr. N. HAMILTON FAIRLEY opened with a paper on tropical sprue, with special reference to intestinal absorption. The difficulty of presenting this subject had, he said, been considerably increased by the recent tendency in America and on the Continent to identify cœliac disease, idiopathic steatorrhœa, and tropical sprue. While absence of intestinal lesions at autopsy and deranged intestinal absorption were common to the three diseases, the inclusion of tropical sprue was not justifiable. Idiopathic steatorrhœa included two groups: (1) adult cœliac disease, cases of which presented bony deformity and a history of prolonged intestinal disturbance in childhood; (2) non-tropical sprue, which was a much rarer and more severe disease than tropical sprue, and often ended fatally despite modern treatment. Dr. Fairley's subsequent remarks concerned only tropical sprue. In this condition steatorrhœa was an outstanding feature and 80 per cent. of cases showed a total fat value exceeding 25 per cent. of the dried fæces (70 cases) on a single examination. With recovery the fæcal fat returned to normal limits. Over 50 g. of fat was not uncommonly excreted in 24 hours in severe cases when on a mixed diet. Hypocalcæmia was common and in 80 cases the average blood calcium equalled 8·8 mg. per 100 c.cm. In 11, it ranged from 5·1 to 7·0 mg. All had tetany. The blood phosphorus varied from 1·6 to 4·0 mg. per 100 c.cm. This finding precluded parathyroid deficiency as a basis of the hypocalcæmia. In 42 out of 50 cases flat glucose curves and curves showing a submaximal or a delayed maximal rise were demonstrated. Such findings had been attributed to the increased rate of removal of sugar from the blood due either to endocrine disturbance (Thaysen) or hypersensitivity to insulin resulting from compensatory excessive carbohydrate intake when fat was being poorly absorbed (Himsworth). Fairley and Bromfield had held defective absorption of glucose responsible. To test these views an intravenous glucose test had been devised. Of 10 cases of tropical sprue so investigated all showed high curves compared with the normal and a marked delay in the return to the fasting sugar level. Furthermore, on recovery, the intravenous glucose curves were always found to be lower and to approximate closely to the normal. This sluggish utilisation of sugar on intravenous injection was attributed to a decreased sensitivity to insulin resulting from defective absorption of glucose which was also the true explanation of the flat and delayed oral sugar curves. It followed that intravenous glucose and insulin were both indicated in gravely ill patients. Unabsorbed glucose underwent fermentation in the small intestine and gave rise to intestinal distension and the gaseous, acid features of the stools. Unabsorbed fat accounted for their greasy, bulky character. Calcium in the gut united with excess of fatty acids to form insoluble calcium soaps and this was probably the basis of the hypocalcæmia. Certainly the treatment of tetany by calcium per os was ineffective until the fat content of the stools had been adequately reduced by lowering the fat intake in the food.

Patients developing sprue sought medical advice for intestinal trouble, not for anæmia. Later in the primary attack and in relapses, anæmia was more constant and more severe, and when fully established it was megalocytic in type and indistinguishable from pernicious anæmia. The Price-Jones curves were similar and true megaloblastic hyperplasia of the bone-marrow occurred. Hyperchromia or orthochromia was the rule; if hypochromia were present complications should be sought. Microcytic anæmia in tropical sprue was invariably due to intercurrent disease. In 100 cases of sprue only 22 failed to secrete acid when histamine (0·25 mg.) was injected. After recovery it was found that the curve of acid secretion gradually returned to its normal level whatever that might have been. Similarly, clinical results indicated that the secretion of intrinsic factor was often only transiently deranged, for many cases of sprue resident in England remained perfectly fit in the absence of a maintenance dose of liver extract. In both these respects tropical sprue differed essentially from pernicious anæmia. Excellent results followed oral liver extract (1½ lb. whole liver daily) provided this treatment was combined with a series of graded high-protein, low-fat, low-carbohydrate diets. There was almost always a maximal reticulocyte response from the seventh to the tenth day and rapid regeneration of both erythrocytes and hæmoglobin. The adverse results reported by Castle and his colleagues (1935) with liver by mouth could only be attributed to the fact that appropriate dietetic measures had not been simultaneously instituted. The rapidity with which sprue patients responded to liver extract per os under these circumstances was comparable to that observed in pernicious anæmia and suggested that defective production of hæmopoietic principle rather than defective absorption caused the megalocytic anæmia. Iron absorption also was unexpectedly good; only occasionally did hæmoglobin production lag sufficiently behind the red cell output to render iron therapy necessary.

Provided appropriate dietary measures were instituted the relative efficacy of liver extract given orally or parenterally appeared to be essentially a question of dosage. In those rare cases where an inadequate hæmatological response followed administration of liver by mouth, parenteral injections were effective only in a correspondingly larger dosage. Clinical experience suggested that both oral and parenteral liver extracts might have effects over and above those explained by their content in anti-anæmic principle. Three crystalline substances had been isolated by Dakin and West. It did not follow, however, that any additional beneficial effects liver extract might possess depended necessarily on its content in a factor or factors absent from the diet of sprue patients. Obviously the pharmacological action of such constituents and their possible direct or indirect effect on the absorptive function of the intestine demanded consideration.

Castle and Rhoads and their co-workers last year attributed sprue in Porto Rico to a deficiency of extrinsic factor in the diet. In Dr. Fairley's series patients came from India, Malaya, China, Manila, and other parts of the world. At the time of develop-

ing sprue the vast majority were living on a diet which compared favourably in its protein content with that taken in Europe and included abundance of eggs and meat, besides vegetables and fruit. Many had been taking beef twice a day, fish once, and eggs and bacon for breakfast. They mainly comprised well-to-do people such as merchants, government officials, judges, bishops, lawyers, and army officers, and in general belonged to a class which did not develop avitaminosis. In Dr. Fairley's opinion the conception of sprue as a primary deficiency disease caused by lack of extrinsic factor or any known vitamin was quite untenable. The theory was not in accord with facts regarding the origin of sprue in parts of the world other than Porto Rico, nor with its absence in countries like Africa where dietary deficiencies were common. Finally it failed to explain the fundamental biochemical findings in regard to fat and sugar metabolism in this disease.

In summarising, Dr. Fairley elaborated his own view that the phenomena of tropical sprue could best be explained in terms of a metabolic breakdown of the gastro-intestinal tract characterised by defective absorption in the small intestine with or without defective secretion of Castle's intrinsic factor by the pyloric and Brunner's glands. Malabsorption generally affected both fat and glucose simultaneously. There were cases, however, where one or other was predominantly implicated; under these circumstances either steatorrhœa and hypocalcæmia or carbohydrate fermentation with decreased glucose tolerance dominated the picture. Avitaminosis, when it occurred, was a secondary phenomenon dependent on malabsorption or too restricted a diet self-imposed with the object of cure. In regard to causation, he pointed out that a somewhat similar intestinal breakdown occurred in hill diarrhœa under conditions of low barometric pressure and high humidity. In tropical sprue the factor and factors determining the breakdown had not been elucidated. The real enigma was geographical distribution, and whoever solved that problem would solve the ætiology of tropical sprue.

CŒLIAC DISEASE

Dr. C. WALLACE ROSS read a paper on intestinal absorption in cœliac disease, with remarks on the effect of liver extract upon carbohydrate metabolism. He began by summarising the recognised deficiencies of cœliac disease, including those relating to fat, protein, vitamins A, B, C, and D, calcium, phosphorus, iron, and Castle's anti-anæmic factor—the last being a great rarity. He then proceeded to examine the position in regard to carbohydrate absorption. Three explanations had been put forward for the flat oral glucose-tolerance curves found by workers in cœliac disease—namely, an endocrine disturbance (MacLean, Sullivan, Thaysen, and others), an excessive tolerance for glucose based on a high carbohydrate intake (Himsworth), and a simple absorptive deficiency (Marfan, Parsons, and others). The speaker presented a number of intravenous and oral glucose-tolerance curves and insulin depression curves showing (1) the association of high intravenous curves with flat oral ones; (2) the possibility of reducing these high intravenous curves towards normal by giving glucose intravenously over a period of time; and (3) the existence in cœliac disease of a state of relative insensitivity to insulin, comparable to that of a normal person on a low carbohydrate diet. These three findings were deemed good evidence of an absorptive deficiency for carbohydrates. A number of intravenous glucose-tolerance curves were then shown which had been derived from cases of cœliac disease, chronic intestinal indigestion without steatorrhœa, abdominal tuberculosis, and cirrhosis of the liver, before and after treatment with Campolon or Anahæmin by injection, or liquid extract of liver by mouth. From these it was suggested that total liver extracts contain a factor, possibly identical with Himsworth's "insulin-kinase," which is capable of improving the glucose tolerance or the sensitivity to insulin where this is impaired by carbohydrate deprivation or by liver disease, sometimes to the great clinical benefit of the patient. This factor is not identical with Castle's "essential, anti-anæmia factor" and is not present to any great extent at least in anahæmin (Dakin and West's fraction). There was at present no evidence that this factor affects absorption.

DISCUSSION

Prof. L. G. PARSONS (Birmingham) said he saw no essential difference between cœliac disease in childhood and the idiopathic steatorrhœa of adults. There were, however, differences—especially in the blood picture—between cœliac disease and tropical sprue. Apart from occasional megalocytic anæmia and glossitis he failed to see any connexion between pernicious anæmia and cœliac disease either in the child or adult. Ross's observation that campolon intravenously improves the impaired glucose tolerance in cœliac disease, while anahæmin has almost no effect, appeared to be an insuperable objection to Castle's view that pernicious anæmia and cœliac disease are conditional deficiencies caused by lack of specific reaction between extrinsic and intrinsic factors. Whatever might be the cause of cœliac disease its symptoms par excellence were those of a deficiency disease; yet, as Fairley had shown in tropical sprue, this was not due to any known deficiency in the diet, but to malabsorption in the gut. It was a question of starvation in the land of plenty! Steatorrhœa was an erroneous term. Not only was there malabsorption of fat, but carbohydrate was involved as well. British pædiatricians had underrated the latter fact, but the work of Ross showed that glycorrhœa was as characteristic of cœliac disease as steatorrhœa.

Dr. H. P. HIMSWORTH said in view of the evidence now brought forward by Fairley and Ross he agreed that his own suggestion was wrong concerning the origin of the low glucose-tolerance curves in steatorrhœa. Glucose apparently was absorbed by an active process involving phosphorylation, lævulose by a process of simple diffusion. This might account for the different behaviour of the two sugars referred to by Prof. Parsons. Dr. Fairley had brought forward convincing evidence that calcium was inadequately absorbed. Johnson in America had recently shown that calcium gluconate in the gut prohibits the absorption of glucose; perhaps there was some connexion between the two. The effect of campolon in increasing the utilisation of glucose described by Ross was very interesting. He himself had tried to demonstrate this kinase action, but had failed.

Dr. JANET VAUGHAN agreed with Prof. Parsons that there were no essential differences between the cœliac disease of children and the idiopathic steatorrhœa of adults. She agreed there was evidence of malabsorption in idiopathic steatorrhœa and reviewed the biochemical results regarding fat, calcium, and glucose. In 9 out of 11 cases flat oral glucose curves had been found, but in contradistinction to the findings in tropical sprue the flat curves persisted after the clinical condition of the patient had enormously improved. Preliminary investigations

in conjunction with Dr. King indicated that there was a wide variation between the venous and arterial blood-sugar level when glucose was injected intravenously, and in this respect there appeared to be a difference in the utilisation of sugar in steatorrhœa patients and normal people. The blood picture was variable. The anæmia might be (1) hypochromic, responding to iron; (2) of megalocytic hypochromic type, responding to Marmite; or (3) erythroblastic (rarely). In cases responding to marmite the anæmia did not arise from lack of extrinsic factor as suggested by Castle.

Dr. REGINALD MILLER commented on the agreement of all speakers that malabsorption was the essential factor in cœliac disease. In his opinion defective absorption of fat was the essential defect and the carbohydrate disturbance secondary.

Dr. ROSS, in reply, said that in 6 cases which still had cœliac disease, but which had improved clinically, there was only slight improvement in the curves—less than he would have anticipated from their clinical progress. He thought Dr. Himsworth's idea regarding the absorption of lævulose a reasonable one.

Dr. FAIRLEY, in reply, said that demonstrable osteoporosis was rare in tropical sprue, though it probably did occur to some degree in chronic cases with persistent hypocalcæmia. In a certain number of selected cases at the Hospital for Tropical Diseases Dr. Mather Cordiner had failed to demonstrate it when people of similar age were used as controls. Obviously tropical sprue was altogether a milder breakdown than that of cœliac disease or of idiopathic steatorrhœa. With recovery both the oral and intravenous blood-sugar curves returned to normal; if they did not the patient had not recovered.

ROYAL SOCIETY OF MEDICINE

SECTION OF DERMATOLOGY

AT a meeting of this section held on May 21st, with Dr. H. W. BARBER, the president, in the chair, a paper was read by Dr. S. LOMHOLT (Copenhagen) on

Alpha and Beta Rays in Skin Therapy

In such a city as London, he said, there were easy means of employing radium emanation, especially beta rays, in the practice of dermatology. During the last 40 years the importance of this treatment had been increasingly recognised in this specialty. Finsen's work on concentrated chemical rays was fundamental, and this method of treating lupus was still the best available. Treatment by X rays and radium had become even more important, but unless great and skilful care were exercised there was a real risk of producing burns, some of which remained incurable. Recent improvements in machines had rendered these burns less frequent however. Finsen's ultra-violet rays did not cause burns, as their potency was almost infinitely less than that of X rays or radium. The magnitude of the energy quantum varied inversely with the wave-length, the energy in the case of short waves being far greater than for long waves. Lord Rutherford had shown that the greater part of the mass of the atom was concentrated in a small nucleus of very high specific gravity. Though a cell might not be killed by irradiation it might suffer permanent damage, and so might lose its power of reproduction. The energy of the ultra-violet ray was comparatively small, but its effect on pathological cells was greater than on normal cells. Alpha rays penetrated the skin to only a short distance, and hence were very suitable in the treatment of superficial skin lesions. It was an effective treatment for psoriasis on the body. Dr. Lomholt showed a number of plaques, charged with emanation, which could be divided up into pieces to fit the lesions to be treated; the amount of charge was regulated according to the particular requirement, with due allowance for loss of potency in the post.

Prof. E. RAMEL (Lausanne) read a paper on

Neuropathic Eczema

He used the term neuropathic for the type of eczema in which the autonomic nervous system acted as a regulator mechanism on the allergic sensitivity of the skin. Recent investigations on the microbial flora of eczematous lesions had proved that the saprophytic microbes were able to produce sensitisation and an eczematous reaction of the skin. Dr. Ramel considered that this power of bacterial sensitisation of the skin was under the control of the autonomic nervous system, and that a certain type of eczema was met with which seemed to be of neuropathic nature, and which could be recognised by the appearance and development of the rash. This was a papulo-vesicular eczema, which at first was limited to one area, but soon showed a tendency to become generalised with a symmetrical distribution. After a period of oozing the eczema assumed the lichenoid form, and the confluent lesions became secondarily lichenified, thus closely resembling neurodermatitis. An important pigmentary change complicated the eczematous lesions, and on the more severe lesions vitiligo appeared. At the time of the appearance of the rash there was a complaint of definite symptoms—i.e., pruritus and intense burning sensations, to the accompaniment, in some cases, of insomnia, and the lack of response to the usual external treatment was a confirmation of the neuropathic character of the trouble. Tests, such as Platz's, showed the presence of a variable neuro-vegetative irritability, which was a subconscious result of the psychic shock. These patients often showed, also, great swelling of the lymphatic glands of groins and axillæ owing to the prolonged scratching. The blood always showed a high eosinophil count. Emaciation followed the injury to the trophic nerve centres; in some cases this went on even to cachexia. A knowledge of psychiatry was a great help in successful treatment.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY

AT a meeting of this society held on May 14th, Dr. EMANUEL MILLER read a paper on the

Limits of Psychopathology

These limits, he said, are defined by two conditions. First the mechanical limit or the limit imposed by heredity and by physical disorder, and (2) the idiosyncrasy of the nervous system. The reaction types can be regarded as in part dependent upon constitutional differences which determine the lines along which emotional development will take place. Whatever be the emotional patterns which develop the neurosis or the psychosis will be along fairly specific lines, although daily psychiatric experience is concerned with varieties and with "mixtures." Whatever be our theories the ultimate neurotic and psychotic forms will be, *to this extent*, predetermined and outside the range of psychotherapy. We can

hope, however, to restore to a patient his basic pattern by reducing the tensions which personal conflicts and frustrations in childhood and adolescence and maturity have produced.

With regard to the limits determined by the psychopathologies themselves, these are determined by the ideology of the theories, their fundamental assumptions. There is a tendency in most scientific disciplines to look for a unifying concept which shall explain the facts they have discovered. If it satisfies a large number of facts it more easily becomes a foundation-stone of doctrine, and the superstructure of theory takes on the shape predetermined by this foundation concept, sometimes where subsequent facts warrant alternative theories. The danger of these unitary ideas in psychological medicine is that the structure of the mind and the method of therapy are profoundly influenced. Adler has taken the idea of superiority and sees it permeating all human behaviour. That this is derived from the inferiority feeling is admitted. Both inferiority and superiority are complex mental states, and while the one may underlie the other, it is in Adlerian analyses not very fundamental. But Adler has nowhere made clear what this really means, whether it is gregariousness, whether it is or not an instinct or search for others and a satisfaction in their presence. We nowhere are told whether these are inborn dispositions or derivations. At most we can say they are all high level conative dispositions, and little if any reference is made to the potency of unconscious processes.

The Freudian psychology has much more to recommend it inasmuch as it bases itself on an instinct psychology which lies at the root of psychogenesis. But here too the search for unitary principles has limited the structure of the mind by the narrow concept of a libido which makes a reductive analysis almost an infinite regress. It is freer, however, from limitations of more superficial psychopathologies in that it gives room for levels of conative activity—the it or instinctual level, the ego level and the level of ego—superstructures—morals, ideals, and sublimations. Psycho-analysis concerns all three levels simultaneously, but it limits the interpretation in lumping together erotic libido and ego libido in two mutually incompatible groups. Furthermore, despite recent developments in the psychology of aggression it does not take us beyond the pleasure principle. The death instinct is a piece of biological speculation and is an illegitimate attempt to escape from the impasse of hedonism to which psycho-analysis has become committed. That the load of sexual tension is greater than all other instincts is undeniable, but psychopathology is unduly limited and human nature unnaturally confined by the exclusion of other fundamental conative drives. For practical purposes as well as for theory a wider instinct theory is more illuminating, and what sheds most and widest light is calculated to produce the best therapy.

REVIEWS AND NOTICES OF BOOKS

Hydrotherapy and Climatotherapy

By MATTHEW B. RAY, D.S.O., M.D., M.R.C.P., Senior Physician, British Red Cross Clinic for Rheumatism, Peto-place, N.W. With a Foreword by Lord HORDER. London: Edward Arnold and Co. 1936. Pp. 312. 12*s*. 6*d*.

THIS book is divided into two sections of which the first contains an admirable introduction to the principles of hydrotherapy and notes on its practical application. Various systemic disorders are also discussed—those of the circulatory, respiratory, and genito-urinary systems, disorders of the skin and of the nervous system, and finally the rheumatic diseases. The author has classified and described the spas "in accordance with their main therapeutic indications" as regards the above disorders. This method of grouping the spas will not meet with general approval, for many hold that a first-class spa should be looked upon as essentially a repairing depôt for disorders of metabolism. Any suggestion that this or that spa is only suitable for this or that disorder is to be deprecated, in so far as it may bolster up ill-equipped spas at the expense of those more deserving of support. Incidentally Harrogate and Bath are scarcely mentioned in connexion with the rheumatic diseases; yet both these spas have long had large voluntary hospitals where hundreds of cases of chronic rheumatic disorders are admitted and treated with a good measure of success every year.

The second section of the book deals with climatotherapy, and here the elementary principles are well set out considering our imperfect knowledge of what part the climatic factor plays in maintaining or promoting health. The short extracts about the health resorts require revision in certain respects. For example, for elderly invalids Weston-super-Mare is recommended in autumn and winter, but not in spring. Anyone who has experienced the cold autumnal and winter winds would discourage elderly invalids from residing there during such months, whereas no place could be more delightful than Weston-super-Mare in April or May. The information supplied on foreign spas and health resorts is rather cursory, but there is much in the book which will stimulate the interest of practitioners in this country.

Electrical Engineering in Radiology

By L. G. H. SARSFIELD, M.Sc., M.I.E.E., A.Inst.P., Research Department, Woolwich. London: Chapman and Hall Ltd. 1936. Pp. 284. 25*s*.

THE developments of post-war years have wrought many changes in the design of X ray equipment, and the simple laboratory hook-up of former times has now been displaced by a comparatively much more complex if more efficient high-tension equipment. A certain amount of electrical knowledge is necessary for anyone who wants to understand every part of this technical work, but of this volume the greater portion is devoted to descriptive matter—notably historical surveys, results of experimental work and development, electrical characteristics, and constructional details, which are all clearly outlined. Mr. Sarsfield points out that recognised engineering standards are now being applied as far as possible to the manufacture of X ray equipment, while at the same time the peculiar requirements of the work to be done by this type of apparatus permit of the application of new standards. Such matters as the choice of suitable materials for the various duties, dielectric stresses, and methods of assembly are dealt with, specimen design sheets being included.

The realm of purely operative technique is avoided but many important hints are given on the best electrical conditions for service; the characteristics of the various components of an X ray set are outlined, and questions of lay-out are discussed. Valve filament operating conditions, the measurement of

essential electrical factors, tests, and the advantages and disadvantages of different methods of rectification all receive attention. In dealing with sphere gap measurements it is pointed out that misleading results may follow breakdown of the gap due to the presence of peaks superimposed upon the fundamental voltage wave applied to the X ray tube. This no doubt accounts for the discrepancies often apparent between the exciting tension as indicated by radiographic results and that indicated by the sphere gap measurement, especially where mechanical rectification is concerned. In this connexion the necessity for knowledge of wave shape is stressed, and, generally speaking, if Mr. Sarsfield's plea for accuracy of measurement is observed, much lower film bills will follow. High-tension systems, high-voltage cables, and the importance of proper earthing are also considered.

Little space is given to the purely physical aspect of X ray tubes, but the various types are well described. Various circuit arrangements, methods of control, maintenance, faults in apparatus, and the vexed question of signals are outlined, while protective measures, electrical safety, and radiation output efficiencies are discussed at some length. A chapter is devoted to describing special equipments for diverse applications in radiology, and such subjects as dark room lighting, heating of developing solutions, protective measures are not ignored. Examination apparatus for medical work does not form part of the subject matter, the author devoting the whole of his attention to the apparatus between the main supply and the X ray tube. Radiologists, X ray students, technicians, and others will welcome this treatise on a highly specialised subject. The book is well illustrated.

The Variation of Animals in Nature

By G. C. ROBSON, M.A., Deputy Keeper of Zoology, British Museum (Natural History); and O. W. RICHARDS, M.A., D.Sc., Lecturer in Entomology, Imperial College of Science and Technology. London: Longmans, Green and Co. 1936. Pp. 425. 21*s*.

IT is not generally realised to what extent modern theories of the causes of evolution are based upon selected evidence and upon the prejudices of the theorist. The fact that at least three fundamentally different theories are in currency at present makes us welcome this unbiased survey of the main facts and conclusions therefrom which have been used in support of these theories. The authors have covered a wide field and have subjected their material to the most searching criticism. Most biologists have assumed either that natural selection (to which 135 pages are devoted) is the main driving force of evolution, or that it is at least a necessary factor in the process, and elaborate mathematical theories have been erected on this basis. It will therefore come as a surprise to many that there is hardly any direct evidence for either of these assumptions, though in connexion with certain phenomena such as mimicry the circumstantial evidence is very strong. The origin and distribution of variations, the effects of isolation, and the concept of "adaptation" are here discussed very fully, and a chapter is given to an examination of the main theories of evolution other than the selection theory. The authors are in the end almost embarrassingly non-committal. They say truly that "any attempt to form an unprejudiced conclusion [as to the causes of evolution] labours under technical difficulties which frustrate it and limit it to a summing of possibilities," but it is difficult to discover to which of these possibilities they consider the present evidence to point. They seem to favour the theory that the variations which have been mainly significant in evolution are of the nature of the mutations of the geneticist, though admitting that it is by no means certain that the environment may not have played a direct part in inducing changes under certain conditions. They do not consider the evidence sufficient to warrant the conclusion that selection has been an all-important factor in the spread of variations. And in this they are at one with the trend of discussion at the Royal Society summarised in a recent leading article (p. 1189).

There can be no doubt that a restraining influence of the kind here attempted is badly needed. Theories are being erected and even accepted as truth which are based upon unproven assumptions and upon experimental evidence of doubtful application to conditions in nature. On the other hand, it is unlikely that such sober argument will prove inspiring to readers. It must be admitted that well-directed flights of the imagination, provided there is a readiness to return to earth at a moment's notice, are the life blood of scientific progress.

Youth, Sex and Life

By GLADYS M. COX, M.B., B.S. Lond. London: C. Arthur Pearson Ltd. Pp. 229. 3*s*. 6*d*.

TO write a book on sex for young people and also for their parents is a difficult task. Dr. Cox has accomplished it with conspicuous success. "Of all the obstacles that stand in the way of human progress and happiness," she writes, "I believe that ignorance, prejudice and intolerance are the most potent, and that selfishness and deliberate cruelty are, more often than not, the products of these three." The book does not purport solely, as do so many that have recently appeared, to give to the young instruction on sexual physiology; it has the broader aim of providing information and guidance upon all the activities in which boys and girls are involved. The chapters deal with the following topics: physical fitness; physiology and health; how the mind works; drugs and gambling; exercise for health and pleasure, and sun-bathing; reproduction in man; adjustment to society; some thoughts on preparation for marriage; and sex problems. They are all written clearly and simply, without those pseudo-religious invocations which modern parents are apt to find slightly nauseating. Dr. Cox does not hesitate to give the reader advice; in fact the book is full of it. But the advice is so balanced and restrained, and couched in such simple and friendly language, that few adolescents could escape being favourably influenced by it. Difficult subjects are deftly handled. Psychology is not an easy subject to teach in such a way as to be intelligible and useful; human reproduction, which in this book is made to fit naturally into a wider context, is notoriously hard to explain to young people without irrelevant circumlocutions. Yet both these topics are dealt with with grace and judgment. Many parents are a little nervous of preaching to their children; and many have inhibitions which deter them from speaking openly about subjects on which they feel that children should be informed. This book should do much to remove these inhibitions. Practitioners are often asked to deal with adolescents passing through difficult phases. They could hardly do better than to introduce this volume to the parents with the suggestion that if it is found acceptable it should be handed on to their young.

THE LANCET

LONDON: SATURDAY, JUNE 6, 1936

THE CHEMOTHERAPY OF STREPTOCOCCAL INFECTIONS

THE history of attempted chemotherapy in bacterial infections is so discouraging that any indisputable success in this direction is almost totally unexpected. It has seemed hitherto that some radical difference between protozoal and bacterial infections offers an insuperable bar to the treatment of the latter by chemical means. Nothing in therapeutics is more certain than the disappearance of malaria parasites or trypanosomes under the influence of appropriate drugs; nothing has been more uncertain or perhaps more frankly disappointing than the effect on such a condition as streptococcal septicæmia of administering all manner of supposedly bactericidal compounds. It is true that many of these are demonstrably incapable of exerting any bactericidal effect in the dilution and under other conditions in which they find themselves within the body, but even were these conditions theoretically favourable in any particular instance, he would be an optimist who expected the old ideal of therapia sterilisans magna to take actual shape. In perhaps the only clear example of an interstitial or generalised bacterial infection which is susceptible to chemotherapy, the action of the drug is almost certainly indirect; this is the action of organic arsenical compounds in anthrax. It may well be true that apart from certain special situations, of which the skin and the urinary tract are examples, the bacteria of established infections are inaccessible to any direct bactericidal agent, either known or yet to be tried. Hence the startling nature of the success claimed for a drug, known best under the name of Prontosil, which made its début in Germany last year. This substance is one of a long series of dye compounds which had been synthesised in the hope of stumbling on something of therapeutic utility, and the original evidence in its favour consisted of experiments in which the development of streptococcal infections in mice was prevented by its administration, and of a number of rather uncritical but highly enthusiastic clinical reports of its effect in acute streptococcal infections in man. These reports and their confirmation on the experimental side by LEVADITI and VAISMAN have already been commented on in these columns.[1]

Now that English workers have fully satisfied themselves of the validity of these claims on the experimental side, and reached a significant if not conclusive stage in clinical trials, the importance of this discovery is brought nearer home. This development is marked by the appearance of two papers in our present issue. Dr. G. A. H. BUTTLE and his co-workers are not only in a position to confirm the original observations on the action of prontosil in mice, but they have studied a number of other new compounds, one of which, *p*-aminobenzenesulphonamide, has proved superior to prontosil itself. The significance of the animal experiments recorded in this and in the paper by Dr. LEONARD COLEBROOK and Dr. M. KENNY which precedes it may perhaps not immediately be grasped. It was shown repeatedly years ago that streptococcal infection in mice could be prevented if within an hour or two of infection the inoculated area were infiltrated with acriflavine or other substances of similar composition. At first sight these new experiments may appear to be of the same nature and of no greater significance, especially as they are sometimes referred to as protection experiments. The difference is that the action of acriflavine is directly bactericidal and purely local, whereas the action of prontosil, whatever it may be, is almost certainly not due to direct bactericidal action, and is obtained by introducing the drug, not locally, but either via the alimentary tract or by subcutaneous injection remote from the site of infection, which in these experiments is in fact the peritoneal cavity. Not only does this drug work, so to speak, at a distance, but it works when administered some days before, or at least some hours after, infection takes place; indeed it appears to have determined recovery in an animal already the subject of bacteræmia. This at any rate is something quite new; it is the first time that any drug has been shown to have a specific and regular effect on an acute bacterial infection when administered by the mouth. All observers are agreed that the effect is limited to infections due to *Streptococcus pyogenes*, although there are slight indications in Dr. BUTTLE'S work that the meningococcus may also prove susceptible.

The conclusions drawn by Drs. COLEBROOK and KENNY on the basis of their clinical experience are commendably cautious. It is very much to be hoped that the therapeutic trial which they have initiated in this country will be extended and made to embrace types of acute streptococcal infection other than puerperal fever. It may well prove that others, mainly for anatomical reasons (since the type of streptococcus, within the *pyogenes* group, appears to be indifferent), react more favourably; erysipelas, for instance, is said by W. KRAMER[2] and others to respond remarkably to the treatment. The other side of the question with which this paper deals to some extent is the least satisfactory in the sense that almost nothing is known about it. How do these compounds act? They are only weakly bactericidal

[1] THE LANCET, Feb. 1st, 1936, p. 269.

[2] Münch. med. Woch., April 10th, 1936, p. 608.

in water, and not bactericidal at all and only bacteriostatic to a limited degree in serum; the serum of treated animals and patients supports the growth of streptococci, though to a somewhat diminished extent, and their virulence after contact with the drug in such fluids is unimpaired. LEVADITI and VAISMAN'S facile and improbable idea that the drug acts by preventing capsule formation is unsupported in these experiments. Even in the whole blood of treated animals no bactericidal action was demonstrable. In fact no in-vitro mixture of bacteria, leucocytes, serum, and the drug itself can be made to do anything which will account for the therapeutic effects observed; clearly nothing short of the whole animal is a suitable field for the activity of this compound. Here therefore is a substance, identified as useful by the method of trial and error, the mode of action of which is wholly unknown. There is presumably a chemical side to the mechanism by which infection is overcome about which we know next to nothing, and on which it happens that this particular type of compound can exert an influence. This discovery, while obviously a therapeutic advance and possibly the prelude to others, is at the same time an indication that in this sphere of medicine we are only groping in darkness and finding something here and there, more by good fortune than by intelligent design. This is not to detract from the great achievements of pioneers in chemotherapy past and present; the symbols "205," "606," and "914" are a sufficient reminder of what they have attained. But these symbols are an indication also of the blind and laborious method by which alone such results can at present be achieved.

MINERAL METABOLISM AND THE SUPRARENAL GLAND

THE growth of knowledge in some departments of medicine is painfully slow. Progress remains at a standstill sometimes for decades together, and, until lately at any rate, it has been difficult for the physician to reply to the layman who taunts him with the common cold or the measles epidemic. On the other hand, progress in some departments is so rapid that even the specialists are bewildered by the frequent reorientation of thought which the new discoveries necessitate. This is the case to-day with certain of the biochemical aspects of medicine, and is well illustrated by the fact that two arresting contributions have been made in the last few weeks to our knowledge of the rôle of the suprarenal gland in mineral metabolism.

One of these comes from investigations at the University of Virginia. SILVETTE and BRITTON,[1] whose work on suprarenal deficiency is already well known, have for some years attributed the fatal effects of suprarenalectomy to the disordered carbohydrate metabolism which ensues rather than to the fall of serum sodium and its attendant complications. In the common laboratory animals these two effects generally go hand in hand, although a partial separation may be effected by administering salt in large quantities. SILVETTE and BRITTON, however, deliberately set out to enlarge the number of species on which suprarenalectomy had been performed in the hope of finding one in which the two effects might have been separated by Nature herself. This they have done, for they have found that in the opossum and marmot removal of the suprarenal leads to the usual disorder of carbohydrate metabolism and death in 6–8 days, but to a rise rather than a fall in the serum sodium. These results do not of course constitute a contradiction of the findings that suprarenal underactivity in dogs, cats, rats, and humans is associated with a sodium deficiency. This is a fact which has been well established by workers all over the world, as will be seen from Dr. MCCANCE'S Goulstonian lectures lately published in this journal. The theoretical significance however of SILVETTE and BRITTON'S observations can hardly be over-emphasised, and it is to be hoped that the explanation of their findings may lead to a better understanding of the whole subject.

The other discovery, which has been made at the Mayo Clinic,[2] is not only of theoretical but also of considerable immediate clinical value. It has been known for some time that one of the signs of suprarenalectomy in the common laboratory animals and of Addison's disease in man is a rise in the serum potassium. The significance of this has not been understood, and the observations have not so far formed the basis of any therapeutic measures. It has now been found, however, that a crisis can be precipitated in suprarenalectomised dogs by the administration of potassium salts, and that a low-potassium diet greatly increases the animal's chances of survival after suprarenalectomy. Further, three patients with Addison's disease were made very much worse by an increased intake of potassium, and a diet low in potassium proved very beneficial. An unsatisfactory potassium-sodium ratio in the diet then may explain those disappointing and all too familiar cases in which the administration of salt has failed to maintain the patient's life. It is clear that, besides being given extra salt, patients with Addison's disease should now be placed on a low-potassium diet; but here a practical difficulty supervenes, for the planning and construction of such diets is not a matter which anyone can undertake. Fortunately the essential data are ready to hand, for potassium content has been determined in all the common American foods by SHERMAN, and the same service has been rendered for English foods by a group of workers at King's College Hospital. It should therefore be an easy matter for an experienced dietitian to give sufferers the necessary advice, and if the results live up to their early promise there is no doubt that directions for the preparation of low-potassium diets will soon be available for all.

[1] Silvette, H., and Britton, S. W.: Amer. Jour. Physiol., 1936, xv., 618.

[2] Wilder, R. N., et al.: Proc. Staff Meet. Mayo Clin., 1936 xi., 273; Allers, W. D., et al.: ibid., p. 283.

THE SURGERY OF BRAIN TUMOURS

WE publish this week the concluding part of a report on the late results of the surgical treatment of intracranial tumours. It constitutes the most thorough and critical analysis of a series of cases of brain tumour yet undertaken, and is a logical sequel to the same author's report to the Medical Research Council in 1929. Mr. CAIRNS has taken the identical cases he encountered when he was Dr. CUSHING'S assistant in 1926–27, and has followed their after-history. While his facts were gathered during a visit to New Haven last year, his paper has been written, and his conclusions formed, since his return to England, and his judgment is the less influenced by local colour and argument. The result, it will be agreed, is a model of how the surgeon should evaluate his handiwork. As he says, the results are from the clinic of one "who has no peer in the art of neuro-surgery," and the organisation of Dr. CUSHING'S unit can scarcely be overpraised. The M.R.C. report revealed one aspect of its efficiency, and the present paper bears witness to the success of its follow-up department. Of the cases which left hospital, "contact has been maintained with every one of these 135 patients." How many surgeons in this country could make a similar statement? There is surely no excuse for our general slackness in this direction. Money would be forthcoming for the inevitable expenses if we were sufficiently dogmatic about its necessity. Every hospital ultimately provides the operating paraphernalia its surgeons require, and such follow-up departments are as essential as special instruments. Lack of coöperation of patients is most often due to lack of contact between surgeon and patient. Frequently in hospital practice, the latter sees his surgeon only once—or even not at all—before and after operation, and there is no opportunity for more intimate discussion. The patient fails to realise that his need of the surgeon is not to be satisfied by the operation alone, but also by post-convalescent observation; and he remains unaware, on the other hand, that the surgeon depends on him for the amassing of experience. Now that the ranks of the profession are better filled, lack of time should no longer be a bar to the formation of this personal contact.

Comparable with the Registry of Bone Sarcomas, there has been set up at New Haven a Registry of Brain Tumours, consisting of full details of Dr. CUSHING'S 2000 cases. As those will realise who have visited or worked in such a clinic—and similar ones are now firmly established in Britain—the amount of work entailed by such careful recording is enormous. But without it such an investigation as Mr. CAIRNS has made would be impossible. His observations will be found important, moreover, to general practitioners as well as to specialists, since they bring home clearly the need and value of early recognition of brain tumours. It is a tragedy that even nowadays, through unnecessary delay, blindness due to gross papilloedema or severe optic atrophy often follows otherwise successful operations for pituitary tumours. And, if he does his part, what prognosis may the practitioner expect? This depends largely, of course, on the type of tumour, and some of the information Mr. CAIRNS provides will seem revolutionary to those unacquainted with the progress of this branch of surgery. The total operative mortality was 14 per cent., which is the mean between figures which vary from 5 per cent. to 30 per cent.; and be it noted, almost every case, however bad the "risk," was given the chance of surgical relief. Of the 135 survivors that left hospital, 63 were still alive at the time of the investigation, a remarkable proportion. Mr. CAIRNS probes much more deeply than this, and shows that 37 are still living useful lives. The bare survival figure would compare very favourably with the results of treatment of tumour elsewhere in the body, but he sees fit to make the comparison with the "useful life" survival-rate.

It is apparent that the glioma must no longer be considered as necessarily malignant: in fact emphasis is laid on the brilliant and permanent results which follow the removal of cerebellar astrocytomas in children. Surprisingly enough, these provide some of the best results of all. Against this must be weighed the fate of patients who have glioblastomas or medulloblastomas—tumours which constitute nearly half of all gliomas and are so persistently invasive as completely to resist surgical extirpation. Most surgeons, indeed, would refrain from operating on a glioblastoma if they could recognise it with certainty, but unluckily there are curable conditions that may closely mimic it. Has the future anything fresh to offer in the treatment of such growths? Radiation has provided means of temporary control, leading at times to remarkable recession of symptoms, and considering the advance of brain surgery during the past thirty years it is reasonable to hope for greater things to come, from one direction or another. For pituitary tumours the prognosis has lately been dealt with by Mr. CAIRNS in a contribution to our Prognosis Series (Dec. 7th and 14th, 1935) in which he said that since pituitary tumour destroys sight rather than life, the risks to life of operative treatment must be reduced to the lowest dimension. This is of course strictly true, but is only half the truth. In the present series, though there was only 1 operative death in 29 cases, as many as 9 more died during the subsequent years, either from evident tumour extension or intercurrent disease. This suggests that a more radical operation would have been justifiable on statistical grounds. Of the 19 survivors, 11 were at full work. The operation through the nose, responsible for these figures, has now been superseded by the transfrontal approach, and doubtless a similar inquiry into the late results of this procedure would prove more favourable, both as regards expectation of life and recovery of vision. Dr. CUSHING quotes figures by W. R. HENDERSON showing that during the decade 1921–31 42 per cent. of transfrontal and 37 per cent. of transphenoidal operations were followed by considerable visual recovery. Virtually complete restoration of vision followed 21 per

cent. of transfrontal operations but only 9 per cent. of transphenoidal. Nevertheless the older operation may still be the better in selected cases.

The question is often asked: Is the surgery of intracranial tumours based on sound economics? Are its results worthy of the enormous expenditure of energy involved? Strictly speaking the reply to such questions comes within the range of the politician; it is no part of the surgeon's duty to consider whether the cost of his apparatus would be better spent on cod-liver oil or battleships. But assuming that we are concerned less with economic organisation than with saving individual patients it becomes possible to reach a limited answer by stages. First, is it worth while, out of 157 cases suffering from a disease otherwise inevitably lethal, to save the lives of 63? Most people would have no hesitation in answering "Yes," though the critical would rightly add, "if the life were worth living." Even they, however, could hardly avoid repeating "Yes" if told that 37 are useful members of society. Do such results justify the means? No one can measure the value of a life, but most of us believe it desirable that we should learn how they may be saved at whatever cost. The means adopted are the responsibility of the neurosurgeons themselves. Though they rest on a very different economic basis from other branches of surgery, and demand a disproportionately greater sacrifice from those interested, they appear to be fully justified by their achievement.

ANNOTATIONS

REPRISALS TO THE DOCTOR'S BILL

EXPERIENCED observers believe that allegations of professional negligence or want of skill are being increasingly employed as a weapon of defence against claims for medical fees. A vast amount of professional treatment is obtained on credit. No tariff or price-list is exhibited upon the surgery wall. Ancient tradition, fortified by judicial recognition, adjusts the charges to the patient's means. Accounts are probably not rendered until the crisis of the illness is over. It would therefore be not surprising if, when at last the bill is presented, the patient's gratitude for past services is less vividly fresh. The defaulting payer may be a husband or a father who is disappointed at the rate of recovery. He may be one who expects much for little or who looks upon the doctors as magicians who guarantee infallibility of diagnosis and certainty of cure. Accusations of negligence, unfortunately, have won a few glittering prizes in the law courts, supported by expert witnesses who will declare with retrospective confidence that some other treatment could or should have been tried. The last thing that an unpaid practitioner desires is worry over the collection of debts; he has other things to think of. If the prospect of allegations of negligence be added, he knows that even complete victory in the law courts will leave him worse off than before. Are these troubles so frequent under a system of cash payment or contract practice? If it be true that they are most often encountered where credit is given, how is the practitioner to mitigate them? The delay in asking for payment, the lump-sum bill, and the uncertainty of the scale of charges—these are elements which in part explain the occasional irritation of the person liable. Yet, after all, the remarkable feature of the situation is not so much the awkwardness of fee-collecting as the fact that default and recrimination are comparatively rare.

COMPLETE CURE IN CARCINOMA OF THE COLON

IN view of the tendency of cancer to occur in the later years of life, survival without evidence of recurrence for twenty years seems justifiable grounds for reporting a "cure." C. F. Dixon and P. F. Olson are able to report 12 of these cases.[1] The time that elapsed since operation ranges from 20 to 24 years. Two of the patients died over 20 years after the resection of the growth, the cause of death in one being unknown, and in the other amputation of an arm. Of the 12 patients 10 were alive at the time of inquiry. The age at operation varied from 30–64; in 9 patients it was 40–60 years. There is no question of the malignancy of the growths removed, for not only are the original pathological reports available, but the growths themselves have been preserved and in every case have been examined again to confirm the diagnosis. The authors normally grade sections of carcinomatous growths, according to certain criteria of malignancy, under four heads. They consider it very significant that in none of the 12 cases of 20 years' survival was the malignancy of the two highest grades. In 6 cases it was Grade I. and in 6 Grade II. It gives some idea of the prognosis of carcinoma of the colon if these figures are compared with the percentage frequencies of the four different grades in a series of cases. For 453 specimens of cancer of the colon, Dixon and Olson give the following figures: Grade I., 14 per cent.; Grade II., 61 per cent.; Grade III., 18 per cent.; and Grade IV., 7 per cent. They also found that the five-year survival-rates in these grades were 66, 54, 38, and 30 per cent. respectively. They feel that the relatively good chance of cure that can be offered to patients with certain types of carcinoma of the colon is a fact that should be recognised and made known.

UNDULANT FEVER IN FRANCE

Dr. Justin Abet, who devotes his inaugural thesis[1] to this subject, states that the first cases of undulant fever to be reported in France were those published in 1908 by Danlos, Wurtz, and Tanon in the Paris district. In 1909 seven cases occurred at Marseilles and epidemics were reported at St. Martial (Gard) and St. Bauzile de Montmel (Hérault). From 1909 to 1912 numerous cases appeared in Languedoc, Provence, and Basses-Cevennes. The disease then came to a standstill and there appeared to be a progressive disappearance of the original foci. In 1920, however, undulant fever made its appearance in several places so that at the Hygiene Congress in 1925 Dubois and Lisbonne classified the affected departments into two groups—viz., (1) those which had been permanently affected, such as Corsica, Alpes-Maritimes, Var, Bouches-du-Rhône, Gard, Hérault, Aude, Pyrénées Orientales and the adjacent

[1] Surg., Gyn., and Obst., May, 1936, p. 874.

[1] Thèse de Paris, 1936, No. 236.

departments of Basses Alpes, Hautes Alpes, Vaucluse, Drôme, Ardèche, Lozère, and Aveyron; and (2) six departments with indigenous cases—viz., Haute Garonne, Hautes Pyrénées, Isère, Savoie, Doubs, and the Rhône. At first undulant fever in France was confined to the regions where abortion in sheep and goats was prevalent and was not found in those in which epizoötic abortion in cattle occurred. After 1930 numerous cases of undulant fever of bovine origin began to make an appearance, cases being reported in Isère, Franche Comté, and Lorraine. In 1932 a ministerial order was issued making undulant fever notifiable and recommending examination of the blood in suspected cases in special laboratories. The recent increase in the number of cases is shown by the following figures. In 1933 408 cases were notified in 44 departments, in 1934 424 cases in 48 departments, and in 1935 427 cases in 53 departments. The notifications, it seems, considerably under-estimated the real incidence of the disease and are only really carried out, according to Dr. Abet, in departments possessing sanitary inspectors and in which practitioners, veterinary surgeons, and laboratories combine in tracking out the disease. The wide dissemination of undulant fever in France is an undoubted fact, but it is impossible to give even an approximate idea of the number of actual cases. In 1925 Lisbonne estimated the annual number of cases at 3 to 4000, but it is probable that this figure has been exceeded at the present time in view of the fact that many cases in country districts are overlooked or not reported.

DIFFERENTIAL CELL COUNTS OF PITUITARY GLAND

IT is satisfactory to find that differential cell counts of the pituitary gland, originally devised by Rasmussen, are being made by research workers despite the extremely tedious nature of such work. It is only thus that the random claims of some endocrinologists, to the effect that specific alterations in the numerical proportions of the three types of cell in the anterior lobe characterise certain pathological conditions, can be verified or disproved. In a recent paper Dr. Frank Hawking[1] reports the results of differential counts of the anterior lobe of the pituitary in 12 cases of essential hypertension, 4 cases of nephritis, 6 cases of diabetes mellitus, 6 cases of hyperthyroidism, and 2 cases of Addison's disease. In 2 cases only of hypertension was the proportion of basophils greater than normal. Hawking cautiously concludes that this increase is not regular enough to be regarded as significant. This conclusion is of importance because it has been widely assumed, following Kraus and Berblinger, that an increase accompanies hypertension whether essential or secondary to nephritis, and this assumption has been a main plank in explaining the constancy of hypertension in Cushing's syndrome. An increase of basophils was found by Hawking in 1 case of diabetes, in 3 cases of hyperthyroidism, and in 1 case of nephritis. There is no confirmation of Kraus's statement that the acidophils are decreased in diabetes nor is there any evidence in hyperthyroidism of a correlation between the acidophil cells and hyperactivity of the thyroid gland. In 3 cases the percentage of basophils was high but the figure was within normal in 2 of these. It is difficult therefore to subscribe to the current view that the pituitary plays a dominant rôle in Graves's disease. In Addison's disease the basophil cells were greatly reduced, the findings here being consistent with those in the larger series published last year by Crooke and Russell.[2]

With respect to the posterior lobe Hawking finds no support for Cushing's theory that basophilic invasion is responsible for the hypertensive state. This theory however has already been sufficiently challenged by the negative observations of J. H. Biggart[3] on eclampsia and of C. Spark[4] on a large series of hypertensive cases. We are still quite ignorant of the significance of basophilic invasion of the posterior lobe and there is evidence—for example, in the different histological reactions of anterior and posterior lobe basophil cells in Addison's disease and in Cushing's syndrome—to suggest that they are physiologically distinct.

[1] Jour. Path. and Bact., May, 1936, p. 689.

ORTHODICHLORBENZENE FOR BUGS

THE bed-bug, as Lord Crawford remarked not long ago in a debate on housing policy, has become a fundamental housing problem. Last year the Medical Research Council at the request of the Ministry of Health appointed a committee to make further investigation into its infestation of houses. The resistance of insects to gaseous fumigants has, it seems, been greatly under-estimated in the past, while the danger to human life from cyanide fumigation has more than once been unfortunately demonstrated. The committee, with Prof. J. C. G. Ledingham as chairman and Mr. A. W. McKenny Hughes as secretary, has made grants for further research into chemical methods of destruction under Prof. J. W. Munro, D.Sc., of the Imperial College of Science. Under his direction investigations have been carried out with orthodichlorbenzene, both diluted and undiluted, but while the bed-bugs have been destroyed it has been found difficult in practice to safeguard the human inhabitants. Moreover the period which is necessary to get rid of the fumes after fumigation is so long as to render the method impracticable for use in occupied premises. What exactly is the toxicity of orthodichlorbenzene vapour to human beings is not yet known, but experiments on animals indicate that it may be toxic in low concentration. In view of these facts the Ministry of Health has issued a warning to local authorities (Circular 1544, May 22nd, 1936), pointing out the undesirability, pending further inquiry, of using orthodichlorbenzene for the disinfestation of inhabited houses.

RADIOGRAPHY OF PULMONARY VESSELS

Prof. Egas Moniz is well known in this country for his work on cerebral arteriography. One of his colleagues in Lisbon, Prof. Lopo de Carvalho, has for some time been applying a similar technique to the lungs, and an account of some experience with his procedure was presented[5] last month to the Société Médicale des Hôpitaux de Paris. A vein at the bend of the elbow is exposed and opened, and into it a radio-opaque ureteral catheter is gently introduced. Its progress is watched on the X ray screen, and it is usually possible to make its tip reach the level of the lower border of the third rib, by which time it lies in the right auricle. Eight to ten cubic centimetres of 120 per cent. sodium iodide solution are then quickly injected through the catheter, and an exposure is made immediately. The timing is always

[2] Ibid., 1935, xl., 255.
[3] Edin. Med. Jour., 1935, n.s. xlii., 113.
[4] Arch. of Path., 1935, xix., 473.
[5] Ameuille, Ronneaux, Hinault, Desgrez, and Lemoine, J. M.: Bull. et mém. Soc. méd. hôp. de Paris, May 18th, 1936, p. 729.

a little uncertain because the relation of the injection to the cardiac cycle can scarcely be controlled, but the film usually shows a dense shadow of the right heart, the pulmonary artery, and its branches. The procedure sounds rather bold, but the French authors claim that no casualties have occurred either in Lisbon or among their own cases; they have desisted where anatomical distortion has obstructed the passage of the catheter, and their worst mishap has been a transient œdema of an arm due to making the injection into the thoracic duct instead of the right auricle.

The early results are interesting. The outline of the pulmonary artery, and its contribution to the silhouette of the heart and great vessels, can be defined with accuracy. Streaky shadows in the lung fields have been proved to represent vessels, not fibrosis. The blood-supply in the vicinity of certain tuberculous lesions and of lung abscesses appeared to be diminished, and from one region occupied by a bronchial carcinoma it was absent. The vessels of a lung collapsed by an artificial pneumothorax did not fill with opaque solution until one or two seconds after those of the expanded lung on the other side—a delay which suggests a greater arterial resistance in the collapsed lung. The authors are hopeful that pulmonary arteriography may throw useful light on physiological and pathological problems—especially, no doubt, those of pulmonary embolism—but they do not foresee a place for it in clinical diagnosis.

THE DANGERS OF BEING HUMAN

THE B.B.C. took a courageous and sensible step in inviting a psycho-analyst of repute to broadcast his views on the relationship of psycho-analysis to the present social system. Dr. Edward Glover, whose previous book addressed to the layman, "War, Sadism, and Pacifism," was reviewed in these columns three years ago, has now collected[1] the talks he broadcast, together with two others which it was considered advisable to omit or curtail because of the occurrence of the Abyssinian war and last autumn's General Election. Dr. Glover's thesis is that below civilised man's apparently rational exterior there exists a primitive instinctual life differing little from that of the savage, and liable to take control, especially in times of crisis. He illustrates this from such features of the social system as the treatment of crime and the search for scapegoats; education; politics; the League of Nations; and the unconscious causes of war. Readers of his previous volume will be familiar with his belief that economic factors are excuses rather than causes of warfare, and that the true causes and prevention are to be sought deeper, in the fears and guilt both of nations and of responsible individuals. At present no form of examination is practised to prevent a borderline psychotic becoming a foreign secretary or dictator, or an inhibited neurotic from becoming a homicidal motorist. Controllers of foreign policy are not even required to show an elementary knowledge of group behaviour in primitive peoples. At a time of almost universal distrust, mutual fear, and rearmament, it is more than alarming to consider that much of foreign policy (however well meant) is carried out with only the vaguest conception of what the psychological effects on national groups are likely to be. It is perhaps not unfair to suppose the clinical impressions of chancellors and prime ministers are apt to be as fallible as any physician's unless backed up by scientific knowledge. While it is improbable that many of his readers will follow Dr. Glover all the way, it should be impossible for any open-minded person, following the argument, to fail to pause and think, and to question some at least of the behaviour he has previously assumed to be rational and civilised. It is interesting that Dr. Glover considers that at present the greatest danger of being human is to give way to those periodic waves of smugness, affecting individuals and nations alike, in which self-satisfaction completely dulls any capacity for self-criticism or self-improvement.

[1] The Dangers of Being Human. By Edward Glover, M.D., Director of Research, London Institute of Psycho-analysis. With an Introduction by the Very Rev. W. R. Inge, K.C.V.O. London: George Allen and Unwin Ltd. 1936. Pp. 206. 5s.

MAN-MADE MALARIA IN INDIA

THE director of the Malaria Survey of India, Lieut.-Colonel J. A. Sinton, has found it necessary to point out, in properly vigorous language,[1] the great extent to which certain procedures, intended to increase prosperity and health in India, have in fact added to poverty, sickness, and death, merely because there has been disregard of their well-known effects in producing conditions favourable to the spread of malaria. Irrigation schemes form one of the most striking examples of this indictment. An engineering department makes its estimates for bringing water to agricultural land, but these are without proper provision for taking the water away when it has done its work. The result is a water-logged soil, whose fertility is thereby lessened, and a high water-table exposed in places as pools whose dangerous anopheles-breeding edges are probably quite disproportionate to the area the pools cover. Malaria follows, bringing not merely its own direct misery but its subsequent weakness, so that the victims can no longer get the best out of their already damaged land, nor the State its proper revenues from them. This sequence has been known in India for ninety years, yet man-made malaria is still being brought into being by it there. A main cause of this deplorable state of affairs was pointed out by Sir Herbert Emerson, Governor of the Punjab, at the opening of the Punjab Engineering Congress in 1935; it lies in the tendency of Government departments to look on matters only as they affect their own budgets, and not as they play a part in the prosperity of the whole Province; for the putting right of these grave defects is not merely expensive, but the cost, so far as the damage can be made good at all, is apt to fall on some other department. The remedy proposed is that work on no project of this sort should be begun until it has been considered by a committee representative of all interests concerned (engineering, agriculture, financial, public health, and any others), and unless all expense necessary to prevent harm has been included in the original estimate. But interdepartmental policies play but a small part in producing man-made malaria in India. The Malaria Commission of the League of Nations wrote in 1930 that attempts at malaria control had failed in that country, not merely through lack of coöperation but through religious objections not always sincere, and through irresponsible opposition in the press; while the Royal Commission on Labour in India wrote next year that action in health matters was too often limited to the toil of filing a written report. Though, then, there has been fault in the administration, now realised and in a fair way met, there has still to be faced by the

[1] Indian Med. Gaz., April, 1936, p. 181.

administration that opposition of vested interests, that stupidity, folly, pig-headedness, and even wickedness whose strength seems not to have been appreciably lessened in the past twelve years.[2]

"DIE EWIGE MASKE"

FEW of us can resist a busman's holiday, especially when it promises a ride through familiar country. The Swiss film "The Eternal Mask," now running at the Academy Cinema, Oxford-street, London, W., shows first the professional dilemma of a young physician-pathologist, portrayed with great skill by Mr. M. Wieman, and later his reaction to the crisis he has precipitated. Convinced by animal experiment of the value of a serum he has produced against epidemic meningitis, Dr. Dumartin tries it on a dying man, in defiance of his chief's orders, with initial success. The patient, after rallying, dies of an embolism which, it is suggested rather surprisingly, could not possibly be due to the intravenous injection of the serum. Unfortunately the hero has been unwise enough to hint to the patient's wife that he is experimenting with a new remedy, and the most stirring episode in the film, from the medical point of view, is the demonstration of the swift consequences of this indiscretion. The widow turns on him, the local newspapers print abusive headlines, and the efforts of his chief to cover his action and to defend the reputation of the hospital are fruitless because Dr. Dumartin has disappeared. His wanderings about town, half-crazed by the tumult he has raised, his rescue from attempted suicide, and his painful return to sanity make a dramatic story. The contrast between the unsuccessful methods of handling the doctor's distemper and the wise psychotherapy which finally restores memory and balance is more likely to impress lay than medical members of the audience, but all will admire the effective use of film technique to suggest the mental adventures of a split personality. There is little to criticise in the vivid presentation of hospital life and ethics, though we ourselves have never met an institution so fortunate in attracting good-lookers to its medical and nursing staff.

DUM-DUMS

THE dramatic excursion into detection which Dr. Osborn describes on p. 1295 has led him to make some useful comments on bullet wounds, and it is appropriate that these should appear at a time when the air is thick with accusations about the use and misuse of the so-called dum-dum bullet. On reviewing the evidence it will be found, we believe, that there is no good reason for regarding these as more horrible than other instruments of warfare. In the first place the definition of them is in practice exceedingly loose. We learn from the "Shorter Oxford Dictionary" that they are named after Dum Dum, a military station near Calcutta, and that the term refers to "a soft-nosed bullet which expands on impact." But the word "expand" is a little deceptive; for all that the soft-nosed bullet does is to break into smaller portions when it encounters hard tissues such as bone. It is here that it differs from jacketed bullets which, when fired at high velocity, have a considerable penetrating power; and the two types of bullet are designed to have different uses. The soft-nosed bullet is not intended to pass *through* the body; its whole force is utilised in inflicting a violent blow, and it has a correspondingly high stopping-power. Hence it is used in hunting large or dangerous animals (e.g., rhinoceros or leopard), which are apt to take little immediate notice of a penetrating bullet; and for the same reason it has been employed by civilised nations in some of their colonial wars. The "dum-dum" bullet is now banned by the rules of war, but the line between legitimate and illegitimate is so slight that British prisoners came near to execution by the Germans in 1914 because they carried the regulation soft lead bullets for their service revolvers! The objection to the dum-dum seems in fact a little unrealistic. Lord Mottistone, in the House of Lords on May 12th, after speaking of them—perhaps truly enough—as more cruel than gas, went on to describe the kind of wound these projectiles make in animals. "There may be a very little hole in front," he said, "but I have frequently seen on the other side a hole as big as both palms." Since the object of the dum-dum is to avoid passage through the body, this type of wound must clearly be exceptional; but the real objection to Lord Mottistone's argument is that he said nothing about the havoc wrought by the standard jacketed bullet from the ordinary service rifle (to say nothing of the high explosive shell). The jacketed bullet fired at high velocity (over 2300 feet per second) can cause wounds as serious as any dum-dum, its exact effect depending mainly on the distance it traverses. At close range (under 200–300 yards) it travels with a slight wobble which usually leads to a large entry wound; at 300–800 yards it leaves the classical small entry and large exit wounds; at over 800 yards it is again likely to make a large jagged hole at entry. The regulation British service rifle bullet, with a velocity of 2400 feet per second, may thus reproduce the damage done by a dum-dum; but even if this is avoided the destruction of tissues along its track can be at least as disastrous. It may cause no wound "as big as both palms," but when fired at close ranges it may have a hidden cavitation action, producing a "tissue quake" with hæmorrhages an inch or more from the path of the bullet, which often means gross destruction. This particular effect of the penetrating hard bullet is obtainable only under appropriate conditions. To get the effect of the dum-dum, however, is ordinarily quite easy. There is no need to break international conventions by cutting the hard jacket off the bullet's point: all that is necessary is to use a rifle of high muzzle velocity at short range, or a firearm of low muzzle velocity with a soft lead bullet.

RESEARCH DEFENCE SOCIETY

THE antagonists of medical research have been less pugnacious than usual during the past year, but the country is still being flooded with the propaganda of the financially well-supported anti-vivisection societies. Sir Leonard Rogers, as honorary treasurer of the Research Defence Society, has inquired into the finances of these societies and has discovered that since 1912, when the report of the Royal Commission appeared, condemning antivivisection methods, they have succeeded in collecting no less than £600,000 from the public. In its annual report the society's committee draws attention to the anti-vivisectionist shops that have become permanent features in certain localities. Some years ago in the House of Commons the Home Secretary said that he had no power to stop these displays: he thought then that the persons responsible could only damage their own cause by spreading the false belief that in this country cutting operations on animals were

[2] A leading article on the subject (quoted by Sinton) appeared in THE LANCET in 1924 (vol. i., p. 855).

allowed to be performed without anæsthetics. In the past year the Research Defence Society has been devoting increased attention to educating the public in the medical and scientific progress resulting from experiments carried out under the Act of 1876. Sir Leonard Rogers has been able to give many lectures to large audiences at universities and medical colleges, to local scientific and debating societies, and, on two occasions, to the boys of well-known public schools. The information given was valuable in helping the hearers to form a balanced opinion on the vivisection controversy. There has also been an increased demand for the society's leaflets, lantern slides, and general information from health authorities and numerous individuals, for use in local debates and lectures. Financially the society's position has slightly improved, thanks to a small legacy and to increasing subscriptions. Continued efforts are being made to obtain new members, in view of the enormous financial resources of the opponents of experiment.

THE ROYAL SOCIETY CONVERSAZIONE

AT the annual conversaziones of the Royal Society workers in different branches of science entertain one another with a wide range of exhibits and demonstrations. As a rule no contributions of purely medical interest are to be found: this is not to be regretted, since medical societies provide many occasions on which doctors show specimens, and the clinical investigator can always get entertainment and often help from seeing technical "tricks" from the repertoire of his colleagues in other sciences, and even if the more complex ones are beyond him enjoy those demonstrations that have a spectacular appeal. This year an exceptionally large number of guests assembled on May 28th. Practical hygiene provided two interesting collections of exhibits. That a brightly polished surface reflects heat well and absorbs it badly has been known for more than a century; the application of these facts to the protection of workers in the tropics or in the furnace rooms of industrial workshops has been shown to be practicable by covering the various materials used in the manufacture of sun-helmets, masks, gloves, and clothing with a layer of metal foil.[1] The use of similarly prepared materials in the construction of houses, factories, ambulances, and ships was illustrated by scale models. Other models showed the methods used in the attempted arrest of transmitted vibrations and noise for the exclusion of such everyday sounds as those of footsteps, electrical motors, and typewriters and for the elimination of traffic vibrations. Prof. H. H. Woollard's serial microphotographs of sensory endings in the human skin have been shown previously to medical audiences. In association with a new æsthesiometer for testing sensibility of the skin to touch and a new tachistoscope for experiments in visual perception and recognition they provided a remarkable group of exhibits. From the physicists came two attractive demonstrations: a collection of beautifully phosphorescent powders and an exhibition of the fluorescent effects excited by mercury vapour discharges in certain mineral salts. The estimation of oxygen in very small quantities of blood, the estimation of minute traces of carbon dioxide given off by living plants, and the micro-analysis of very small volumes of mixed gases provided examples of the greatly increased sensitivity and accuracy of chemical laboratory methods. Some common insects were used for three of the biological exhibits. It was shown that the fine hairs of the anal cercus of a cockroach, clearly visible under the microscope, vibrated so rapidly on the approach of a bowed tuning-fork that they became invisible. The frequency of the responses set up by these hairs in their afferent nerves bears the same relation to the frequency of stimulation as does that set up in the mammalian auditory nerve by stimulation of the cochlea, so that it is possible, with a suitable stimulus, to obtain responses from tactile end-organs of a form that has hitherto been regarded as peculiar to the auditory apparatus. The blood-sucking bug rhodnium moults five times during development, passing through four newt and one adult stage. A very small gland in its head secretes both a moulting and an inhibitory hormone: the former, given to a first-stage newt, turns it immediately into a minute adult; the latter, given to a fourth-stage newt, causes it to turn into a giant nymph. The third biological contribution, one of more direct medical interest, is concerned with the study of the climatic factors influencing the multiplication of fleas. Mice, each sown with a numbered population of fleas, are kept separately for several weeks under standard conditions of humidity, warmth, and air supply. The conditions thus defined as inimical to the survival and to the propagation of fleas are expected to have important practical application in the control of flea-borne diseases such as plague.

[1] See THE LANCET, 1934, i., 37.

CHILDREN UNDER SCHOOL AGE

ON May 29th the Minister of Health addressed a circular (No. 1550) to local authorities charged with child welfare, expressing his anxiety about the attention given to the health of children between the ages of eighteen months and five years. In this transition period between infancy and school life, 16 per cent. of the children suffer from some disease or defect which is only discovered on entering school. The Minister recalls the intentions of the circular (B. of E. No. 1444), issued last January, about the provision of nursery schools and the admission of young children to infants' departments of elementary schools; he adds: "It is clear that whatever provision is made on the lines there suggested, very considerable numbers of children under the age of five will remain at home." It should, he states, be the duty of the health visitor to see these children at regular intervals; for, even in the few places where there are pre-school (sometimes called toddlers') clinics, their success must depend largely on regular visiting at home by the health visitor. The circular points out how desirable it is for the same authority (then, of course, the school medical service) to be concerned throughout with the health of the growing child, and where there is divided authority the Minister suggests ways in which the drawbacks could, and should, be removed; and finally he insists that no authority will get efficient work out of its health-visiting staff unless it pays them proper salaries. The circular ends with a R.S.V.P. to the addressee, to which we may hope the reply will be very prompt.

AT a meeting of the court of Edinburgh University last week, intimation was made of a grant from the Rockefeller Foundation for research work in neurosurgery. The work will be carried out by a team of workers under the direction of Mr. Norman Dott, and the grant which totals £7500 will be applied to these studies during the five years from June 1st, 1936. A special ward will be provided for Mr. Dott's use at the Royal Infirmary.

PROGNOSIS

A Series of Signed Articles contributed by invitation

CIII.—PROGNOSIS OF URINARY CALCULI

IN considering the prognosis of urinary calculi it is convenient first to view the urinary tract as a whole, and then to discuss in more detail calculi in kidney, ureter, bladder, prostate, and urethra. Urinary calculi, for all practical purposes, may be considered to originate in the kidney or bladder: they may be *primary*—i.e., occurring in an otherwise healthy urinary tract—or *secondary* to infection or obstruction. The common primary stones are composed of (1) uric acid, ammonium and sodium urate, or calcium oxalate, all of which occur in acid urine; or (2) calcium phosphate, or calcium carbonate, which occur in neutral or alkaline urine. Secondary stones, which are deposited in alkaline urine as a result of bacterial decomposition, are formed of calcium, ammonium and magnesium phosphate ("triple phosphate"), and calcium carbonate. The most common organism associated with stone is the *Staphylococcus albus;* in fact, when it is found in a urine, search should be made for stone. In considering the prognosis of each individual case various questions present themselves: what is the risk of leaving the stone alone, what are the chances of the patient passing it himself, what are the operation risks, and what the indications for operation; what should be regarded as contra-indications, and what can be done to prevent recurrences in the future? The answer to all these questions will be found in complete and systematic investigation of each case by X rays, pyelography (intravenous or ascending), cystoscopy, examination of the separated urines, bacteriology, and blood-urea estimate.

If a stone remains in the kidney it ultimately destroys the organ: the kidney undergoes fibrosis, and the pelvis and calices dilate, resulting in hydronephrosis. Sooner or later infection follows, and this in turn may result in pyonephrosis and perinephric abscess. A kidney with stone is also more likely to develop malignant disease than is a normal kidney. It has been estimated that 50 per cent. of unoperated cases of renal stone end with bilateral stones. A stone in the ureter usually produces incomplete obstruction, but eventually causes equally severe damage to the kidney. Should the obstruction become complete, anuria may result. A stone left in the bladder may produce obstruction and infection of the bladder and eventually pyelonephritis. A shadow shown in the kidney area by X rays should not be accepted as a kidney stone—especially on the right side where it may be a gall-stone—until it is proved to occupy the same position in the kidney in skiagrams taken during inspiration and expiration. A lateral X ray, moreover, will show a kidney stone to be lying on the bodies of the vertebræ: an intravenous pyelogram will settle any further doubt and give valuable information both as regards the position of the stone and the condition of the kidney. A stone fixed in one of the calices is less likely to pass naturally, but on the other hand it is doing a minimum of damage, and one can afford to wait: a uroselectan X ray will show whether it is held by a neck too narrow to allow its passage into the pelvis. When a calculus has passed out of the kidney into the ureter, it may be held up there, the commonest places of obstruction being the upper end, lower end, and, less often, the pelvic brim where the ureter crosses the iliac vessels. A stone which reaches the bladder generally passes without difficulty, especially in women, but it may stick in the internal meatus or in the urethra.

KIDNEY STONES

Assuming an otherwise healthy subject, when the urine is uninfected and the stone of such a size that it can be removed through the renal pelvis, the operation risk is a small one, estimated at about 2 per cent.: whereas in cases of urinary infection, and a stone too large to allow removal through the pelvis, which necessitates cutting into the renal parenchyma, the risk may be as high as 20 per cent. From the foregoing considerations it is seen that most aseptic kidney stones are best removed, though exception may be made in the case of a fixed stone which is doing no damage and producing little in the way of symptoms or disability. It may be unnecessary also to remove multiple small stones from a patient who passes them from time to time. When the stones are bilateral, it is advisable to operate on the better kidney first; this gives the surgeon a free hand to deal with its fellow later on. Large bilateral stones are probably best left alone. The kidney function is already impaired, and removal of the stones involves cutting into the kidney tissue and producing further damage; there is also a risk of secondary hæmorrhage, which does not occur when the stone is removed through the pelvis.

The onset of infection is an indication for operation, since when infection is added to back pressure damage to the kidney progresses more rapidly. In most cases in which infection is secondary to stone, the infection clears when the stone has been removed.

Secondary stones come into a different category: it is doubtful how far removal of the stone will effect recovery of the kidney, and unless the infection is cured, the stone will recur. Provided the second kidney is healthy and uninfected, nephrectomy may be preferable to pyelolithotomy or nephrolithotomy; this is especially so when the infecting organism is the *Staphylococcus albus*. Patients with large branched bilateral calculi, plus infection, should be operated upon only if some urgent complication demands it. Much can be done for them by spa treatment.

URETERIC STONES

Eighty per cent. of the stones which pass the ureteropelvic junction eventually reach the bladder, without producing a complete persisting block or necessitating operation. Surgical intervention becomes necessary however if a complete kidney block persists: the onset of this is characterised by severe kidney pain, and may be accompanied by complete anuria. Other indications for operation are symptoms of infection and evidence of dilation of ureter and kidney, determined by intravenous pyelography. Once dilation begins behind the obstruction the chances of the stone passing naturally are diminished. Every case of ureteral stone should be X rayed every two months, and if the stone has not progressed downwards since the last X ray examination, intravenous pyelography should follow. The position of the stone should be confirmed shortly before operation, in every case that comes to operation.

BLADDER STONES

A stone lodged in the intravesical portion of the ureter gives rise to frequency and pain at the end

of micturition, symptoms which might lead to the conclusion that it had reached the bladder. An X ray may be deceptive, so that cystoscopy is advisable. The majority of bladder stones, however, that one has to legislate for, are relatively large and their most fertile causes are (1) obstruction and infection, (2) conditions which prevent proper emptying of the bladder—e.g., a diverticulum, and (3) diseases of the central nervous system. The ideal method of treating an uncomplicated bladder stone is to crush and evacuate it; in skilled hands this is a safe procedure, and entails only a few days in bed. Recurrence is due, not to leaving fragments behind (as can be proved by cystoscopy), but to continuation of the conditions which produced the stone. For example, a stone associated with prostatic obstruction is only an incident in the course of an enlarged prostate, and the correct procedure is prostatectomy. A stone associated with stricture may be crushed after internal urethrotomy. Stones formed round a foreign body are not suitable for litholapaxy; the latter is contra-indicated also with sacculated stones (dumb-bell-shaped stones, of which one part lies in a sacculus and the other projects into the bladder), and when a diverticulum is present, as this prevents proper evacuation of the fragments. Care is needed when litholapaxy is done on a patient whose bladder has been opened suprapubically on some former occasion, since it is easy to tear the bladder from the scar with the evacuator and thus to produce a perforation.

PROSTATIC STONES

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URETHRAL STONES

The most common sites for a stone to lodge are in the region of the triangular ligament, and at the fossa navicularis. A stone held in the former position can be pushed back, with a large bougie, into the bladder, where it can be crushed and evacuated; whereas in the latter situation it can be delivered by meatotomy. A stone lodged behind a stricture may necessitate urethrotomy. Large stones are found occasionally in the posterior urethra. I removed recently, by suprapubic operation, one that had resisted treatment by Christian Science for seven years.

Prophylaxis

We now have to consider what can be done to prevent recurrence of stone. We know little about its causation, but the main factors appear to be the deposit of crystals from the urine, and the presence of an "irreversible" colloid which acts as a scaffold round which the stone is built. Heredity, climate, food, and water-supply ("chalky" or hard water) all play their part, and deficiency of vitamin A may be a factor. Heredity is exemplified by the tendency to produce uric acid and the rarer cystin stones: in hot climates the concentration of the urine favours stone formation; and the influence of food is shown in India, where stone is common in the wheat-growing areas, but rare in the rice-growing ones. Crystals deposited in the urine may be of uric acid, calcium oxalate, or phosphates; and the general principles to be adopted by those who pass crystals are to eat moderately, to attend to the bowels carefully, to take regular exercise, and to flush the urinary tract daily with appropriate mineral waters; this is done best before breakfast, when the stomach is empty. The recurrence of secondary stones may be prevented by relieving obstruction, treating the bacterial infection, and keeping the urine acid. Spa treatment from time to time is of great benefit with both primary and secondary stones.

The uric acid in the urine is partly endogenous, from the products of metabolism, and partly exogenous, from food nucleins. The indications, therefore, in patients passing uric acid crystals or stones are to eliminate foods rich in purins (liver, sweetbread, kidney meat extracts) and to flush the urinary tract with alkaline waters (Contrexeville, Evian, Vichy); so-called uric acid "solvents" are of doubtful benefit. The oxalates in the urine, normally kept in solution by the acid sodium phosphate, are also partly exogenous, derived from the oxalic acid and calcium of the food, and partly endogenous from protein metabolism. Insoluble calcium oxalate crystals are deposited in acid urine, especially after ingestion of substances with a high oxalate content. A vegetarian diet is more prone to produce oxaluria than a meat one. Oxalate stones are the least likely to recur, and though we have little control over endogenous oxalates much can be done to prevent recurrence by diet and moderation of alcohol. These patients should avoid strawberries, raspberries, pears, rhubarb, beetroot, asparagus, spinach, and tomatoes: they should abstain from excess of sweets, chocolates, and jams. Meat extracts and "insides" (liver, kidney, sweetbread) should be forbidden. The best alcoholic drink for them is dry cider, malic acid being a solvent of oxalates, but they are allowed in moderation claret, burgundy, dry sherry and dry champagne, old whisky, and gin. They should flush the urinary tract daily with alkaline minerals, as already indicated. Magnesium salts—e.g., Dinneford's magnesia—taken from time to time may be helpful.

In phosphaturia there is a diminution in the urine of the acid salts which keep the phosphate in solution, and when the urine becomes neutral or alkaline these are deposited. With certain bacterial infections the urine becomes alkaline and triple phosphates are deposited. Phosphaturia is apt to follow the ingestion of too much alkali; it occurs also with dyspepsia and with overwork, worry, and mental strain. In patients suffering from phosphaturia these conditions should be corrected, the urine should be rendered acid—by dilute mineral acids or acid sodium phosphate—and the vegetable food limited.

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POISONS law is an intricate subject and the practitioner who would try to master it should read Mr. Linstead's excellent book,[1] but, before doing so, let him be warned that he may require more leisure than he has a right to expect and a reserve of patience which should, more properly, have been exhausted in coping with the sick—and their relations. Nevertheless, whether they wish to go deeply into the subject or not, all practitioners must willy-nilly familiarise themselves with certain points in the new poisons rules which came into force on May 1st last.

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So much for the rules about poisons in the First Schedule in so far as they affect practitioners. By referring to the list at the end of this article it will be seen that the Fourth Schedule consists of some of the drugs in the First Schedule in respect of which the restrictions are even more exacting. Under the new rules, a doctor's prescription is necessary before any substance in this group or any preparation containing one of them can be sold retail, and this applies to all proprietary preparations, sold under trade names, which contain any of these substances. Not only must the prescription be signed by a doctor and dated in his own hand. It must also have his address on it (unless it is a N.H.I. or local authority prescription), the patient's name and address, the total amount of medicine and the dose. Further, unless the doctor specifies how many times or at what intervals the prescription is to be repeated, it can only be dispensed once and, unless the prescription is made out accurately according to the rules, it cannot be dispensed at all.

It is not easy to foresee as yet all the end-results of these new restrictions but one obvious and salutary effect of them will be the disappearance of these poisons, notably amidopyrine, from patent medicines, which should help to check the deplorable habit of indiscriminate symptomatic self-treatment so freely indulged in by the public. This, in itself, should help to console practitioners for the extra trouble involved. It was not to be supposed that the new rules would work smoothly from the beginning without a hitch of any kind. Most of the difficulties which have so far cropped up have been primarily matters of concern to pharmacists rather than to doctors, but one or two points of interest to both may be mentioned. For example, into what category fall such things as mouth-washes, eye-drops, ear-drops, and douches? Are they to be regarded as medicines for internal or external application? The ruling here seems to be that they should be dispensed in "poison" bottles but need not be labelled "For external use only." The Pharmaceutical Society has also asked the Home Office for a ruling, which has not yet been promulgated, on the question as to how many times a chemist may repeat a barbiturate prescription marked "To be repeated." Pending the Home Office decision, we would point out that, according to the letter of the rules, such a prescription is inaccurate and therefore should not be dispensed at all.

FIRST SCHEDULE

Substances falling within the Poisons List to which special restrictions apply

Alkaloids, the following; their salts, simple or complex:
- Acetyldihydrocodeinone.
- Aconite, alkaloids of, except substances containing less than 0·02 per cent. of the alkaloids of aconite.
- Apomorphine except substances containing less than 0·2 per cent. of apomorphine.
- Atropine except substances containing less than 0·15 per cent. of atropine.
- Belladonna, alkaloids of, except substances containing less than 0·15 per cent. of the alkaloids of belladonna calculated as hyoscyamine.
- Benzoylmorphine.
- Benzylmorphine.
- Brucine except substances containing less than 0·2 per cent. of brucine.
- Calabar bean, alkaloids of.
- Coca, alkaloids of, except substances containing less than 0·1 per cent. of the alkaloids of coca.
- Cocaine except substances containing less than 0·1 per cent. of cocaine.
- Codeine except substances containing less than 1 per cent. of codeine.
- Colchicine except substances containing less than 0·5 per cent. of colchicine.
- Coniine except substances containing less than 0·1 per cent. of coniine.

[1] Poisons Law. By Hugh N. Linstead, secretary of the Pharmaceutical Society of Great Britain. Reviewed in a leading article in THE LANCET of May 16th (p. 1121).

of micturition, symptoms which might lead to the conclusion that it had reached the bladder. An X ray may be deceptive, so that cystoscopy is advisable. The majority of bladder stones, however, that one has to legislate for, are relatively large and their most fertile causes are (1) obstruction and infection, (2) conditions which prevent proper emptying of the bladder—e.g., a diverticulum, and (3) diseases of the central nervous system. The ideal method of treating an uncomplicated bladder stone is to crush and evacuate it; in skilled hands this is a safe procedure, and entails only a few days in bed. Recurrence is due, not to leaving fragments behind (as can be proved by cystoscopy), but to continuation of the conditions which produced the stone. For example, a stone associated with prostatic obstruction is only an incident in the course of an enlarged prostate, and the correct procedure is prostatectomy. A stone associated with stricture may be crushed after internal urethrotomy. Stones formed round a foreign body are not suitable for litholapaxy; the latter is contra-indicated also with sacculated stones (dumb-bell-shaped stones, of which one part lies in a sacculus and the other projects into the bladder), and when a diverticulum is present, as this prevents proper evacuation of the fragments. Care is needed when litholapaxy is done on a patient whose bladder has been opened suprapubically on some former occasion, since it is easy to tear the bladder from the scar with the evacuator and thus to produce a perforation.

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Two general rules applicable to all poisons should be borne in mind. The first deals with the storage of poisons in the surgery or dispensary. Henceforward the doctor must see that all his containers are impervious to the poisons they contain and that they are stout enough to prevent leakage. Secondly, when he supplies an embrocation, liniment, lotion, liquid antiseptic, or any other substance for external application, he must ensure that the container in which it is supplied is labelled so as to show not only the nature of the article—e.g., "The Lotion," "The Liniment," &c.—but also the words "For external use only."

The new rules comprise 12 schedules. Mercifully for him, the practitioner need concern himself with only two of these—namely, the first and fourth—the remaining 10 schedules being matters for the pharmacist. Appended is a list of the poisons in the First and Fourth Schedules, and we think that the practitioner would be well advised to cut it out and hang it conspicuously in his surgery so that he, and his dispenser if he has one, can readily refer to it. The First Schedule consists of a large number of substances to which special restrictions apply. For the purposes of his profession, a doctor may buy poisons from any "authorised seller of poisons"—i.e., a chemist or a wholesale or manufacturing firm—but, under the new rules, these substances in the First Schedule can only be supplied by a seller to a doctor on receipt of a written order signed by the doctor. It is true that, in an emergency, the doctor can get a supply of any substance in this schedule either by going in person to the chemist and signing the poisons register or, alternatively, by promising to send the written order, duly signed, to the chemist within 24 hours of receiving the substance; but, should he forget or otherwise fail to supply the written order, he becomes liable under the Dangerous Drugs Act to a penalty which may take the form of a fine or even imprisonment—not, we are relieved to find, of banishment or execution. Again, when dispensing a medicine containing a substance in the First Schedule, the practitioner is now required to label the bottle with his own name and address, to enter the date of supply of the medicine in his day-book, and also the ingredients of the medicine, the quantity, and, finally, the name of the person to whom the medicine was supplied.

So much for the rules about poisons in the First Schedule in so far as they affect practitioners. By referring to the list at the end of this article it will be seen that the Fourth Schedule consists of some of the drugs in the First Schedule in respect of which the restrictions are even more exacting. Under the new rules, a doctor's prescription is necessary before any substance in this group or any preparation containing one of them can be sold retail, and this applies to all proprietary preparations, sold under trade names, which contain any of these substances. Not only must the prescription be signed by a doctor and dated in his own hand. It must also have his address on it (unless it is a N.H.I. or local authority prescription), the patient's name and address, the total amount of medicine and the dose. Further, unless the doctor specifies how many times or at what intervals the prescription is to be repeated, it can only be dispensed once and, unless the prescription is made out accurately according to the rules, it cannot be dispensed at all.

It is not easy to foresee as yet all the end-results of these new restrictions but one obvious and salutary effect of them will be the disappearance of these poisons, notably amidopyrine, from patent medicines, which should help to check the deplorable habit of indiscriminate symptomatic self-treatment so freely indulged in by the public. This, in itself, should help to console practitioners for the extra trouble involved. It was not to be supposed that the new rules would work smoothly from the beginning without a hitch of any kind. Most of the difficulties which have so far cropped up have been primarily matters of concern to pharmacists rather than to doctors, but one or two points of interest to both may be mentioned. For example, into what category fall such things as mouth-washes, eye-drops, ear-drops, and douches? Are they to be regarded as medicines for internal or external application? The ruling here seems to be that they should be dispensed in "poison" bottles but need not be labelled "For external use only." The Pharmaceutical Society has also asked the Home Office for a ruling, which has not yet been promulgated, on the question as to how many times a chemist may repeat a barbiturate prescription marked "To be repeated." Pending the Home Office decision, we would point out that, according to the letter of the rules, such a prescription is inaccurate and therefore should not be dispensed at all.

FIRST SCHEDULE

Substances falling within the Poisons List to which special restrictions apply

Alkaloids, the following; their salts, simple or complex:
- Acetyldihydrocodeinone.
- Aconite, alkaloids of, except substances containing less than 0·02 per cent. of the alkaloids of aconite.
- Apomorphine except substances containing less than 0·2 per cent. of apomorphine.
- Atropine except substances containing less than 0·15 per cent. of atropine.
- Belladonna, alkaloids of, except substances containing less than 0·15 per cent. of the alkaloids of belladonna calculated as hyoscyamine.
- Benzoylmorphine.
- Benzylmorphine.
- Brucine except substances containing less than 0·2 per cent. of brucine.
- Calabar bean, alkaloids of.
- Coca, alkaloids of, except substances containing less than 0·1 per cent. of the alkaloids of coca.
- Cocaine except substances containing less than 0·1 per cent. of cocaine.
- Codeine except substances containing less than 1 per cent. of codeine.
- Colchicine except substances containing less than 0·5 per cent. of colchicine.
- Coniine except substances containing less than 0·1 per cent. of coniine.

[1] Poisons Law. By Hugh N. Linstead, secretary of the Pharmaceutical Society of Great Britain. Reviewed in a leading article in THE LANCET of May 16th (p. 1121).

Cotarnine except substances containing less than 0·2 per cent. of cotarnine.
Curarine.
Diacetylmorphine.
Dihydrocodeinone.
Dihydrohydroxycodeinone.
Dihydromorphine.
Dihydromorphinone.
Ecgonine except substances containing less than 0·1 per cent. of ecgonine.
Emetine except substances containing less than 1 per cent. of emetine.
Ergot, alkaloids of.
Ethylmorphine except substances containing less than 0·2 per cent. of ethylmorphine.
Gelsemium, alkaloids of, except substances containing less than 0·1 per cent. of the alkaloids of gelsemium.
Homatropine except substances containing less than 0·15 per cent. of homatropine.
Hyoscine except substances containing less than 0·15 per cent. of hyoscine.
Hyoscyamine except substances containing less than 0·15 per cent. of hyoscyamine.
Jaborandi, alkaloids of, except substances containing less than 0·5 per cent. of the alkaloids of jaborandi.
Lobelia, alkaloids of, except substances containing less than 0·5 per cent. of the alkaloids of lobelia.
Morphine except substances containing less than 0·2 per cent. of morphine calculated as anhydrous morphine.
Nicotine.
Papaverine except substances containing less than 1 per cent. of papaverine.
Pomegranate, alkaloids of, except substances containing less than 0·5 per cent. of the alkaloids of pomegranate.
Quebracho, alkaloids of.
Sabadilla, alkaloids of, except substances containing less than 1 per cent. of the alkaloids of sabadilla.
Solanaceous alkaloids, not otherwise included in this Schedule, except substances containing less than 0·15 per cent. of solanaceous alkaloids calculated as hyoscyamine.
Stavesacre, alkaloids of, except substances containing less than 0·2 per cent. of the alkaloids of stavesacre.
Strychnine except substances containing less than 0·2 per cent. of strychnine.
Thebaine except substances containing less than 1 per cent. of thebaine.
Veratrum, alkaloids of, except substances containing less than 1 per cent. of the alkaloids of veratrum.
Yohimba, alkaloids of.

Allylisopropylacetylurea.
Amidopyrine; its salts.
Amino-alcohols, esterified with benzoic acid, phenylacetic acid, phenylpropionic acid, cinnamic acid or the derivatives of these acids, except in substances containing less than 10 per cent. of esterified amino-alcohols.
Antimonial poisons except substances containing less than the equivalent of 1 per cent. of antimony trioxide.
Arsenical poisons except substances containing less than the equivalent of 0·01 per cent. of arsenic trioxide.
Barbituric acid; its salts; derivatives of barbituric acid; their salts; compounds of barbituric acid, its salts, its derivatives, their salts, with any other substance.
Barium, salts of.
Cannabis; the resin of cannabis; extracts of cannabis; tinctures of cannabis; cannabin tannate.
Cantharidin except substances containing less than 0·01 per cent. of cantharidin.
Cantharidates except substances containing less than the equivalent of 0·01 per cent. of cantharidin.
Digitalis, glycosides of, except substances containing less than 1 unit of activity (as defined in the British Pharmacopœia) in 2 grammes of the substance.
Dinitrocresols; dinitronaphthols; dinitrophenols; dinitrothymols.
Ergot; extracts of ergot; tinctures of ergot.
Guanidines, the following: polymethylene diguanidines, dipara-anisyl-phenetyl guanidine.
Hydrocyanic acid except substances containing less than 0·1 per cent. of hydrocyanic acid (HCN); cyanides except substances containing less than the equivalent of 0·1 per cent., weight in weight, of hydrocyanic acid (HCN); double cyanides of mercury and zinc.
Lead, compounds of, with acids from fixed oils.
Mercuric chloride except substances containing less than 1 per cent. of mercuric chloride; mercuric iodide except substances containing less than 2 per cent. of mercuric iodide; nitrates of mercury except substances containing less than the equivalent of 3 per cent., weight in weight, of mercury (Hg); potassio-mercuric iodides except substances containing less than the equivalent of 1 per cent. of mercuric iodide; organic compounds of mercury except substances containing less than the equivalent of 0·2 per cent., weight in weight, of mercury (Hg).
Metanitrophenol; orthonitrophenol; paranitrophenol.
Nux Vomica except substances containing less than 0·2 per cent. of strychnine.
Opium except substances containing less than 0·2 per cent. of morphine calculated as anhydrous morphine.
Ouabain.
Oxycinchoninic acid, derivatives of; their salts; their esters.
Phenetidylphenacetin.
Phenylcinchoninic acid; salicyl-cinchoninic acid; their salts; their esters.
Phenylethylhydantoin; its salts; its acyl derivatives; their salts.
Picrotoxin.
Savin, oil of.
Strophanthus, glycosides of.
Thallium, salts of.
Tribromethyl alcohol.

FOURTH SCHEDULE

Substances required by Rule 12 to be sold by retail only upon a prescription given by a qualified medical practitioner, registered dentist or registered veterinary surgeon

Amidopyrine; its salts.
Barbituric acid; its salts; derivatives of barbituric acid; their salts; compounds of barbituric acid, its salts, its derivatives, their salts, with any other substance.
Dinitrocresols; dinitronaphthols; dinitrophenols; dinitrothymols.
Phenylcinchoninic acid; salicyl-cinchoninic acid; their salts; their esters.
Sulphonal; alkyl sulphonals.

A leaflet prepared by the Pharmaceutical Society gives the following list of some of the substances coming within the Fourth Schedule, in the form in which they are usually prescribed:—

Acitophosan.
Agotan.
Alepsal.
Algodorm.
Allobarbitone.
Allonal.
Amidophen.
Amidopyrine.
Amytal.
Anegrine.
Angiolysin.
Anotal.
Arcanol.
Asciatine.
Atocin.
Atophan.
Atophanyl.
Atoquinol.
Barbital.
Barbitone and soluble barbitone.
Barbituric acid.
Benzedo compound.
Cafinal.
Chineonal.
Chloroxyl.
Cibalgin.
Cinchophen.
Cinchosal.
Codeonal.
Compral.
Creslumin.
Cyclobarbital.
Dekrysil.
Dial.
Dialacetin.
Diallylbarbituric acid
Dibromin.
Didial.
Diethylbarbituric acid.
Diethylamonylurea.
Dinitrocresols dinitronaphthols; dinitrophenols; dinitrothymols.
Disulphamin.
Ditonal.
Diogenal.
Ephepyrin.
Eupaco.
Euvalerol elixir B.
Evipan.
Gardan.
Gardenal.
Gorun cachets.
Hebaral sodium.
Hemypnone.
Hypnogen.
Ipral.
Leucotropin.
Luminal.
Malonal.
Malonurea.
Medinal.
Merbaphen.
Methylsulphonal.
Nembutal.
Neocinchophen.
Neonal.
Neophenoquin.
Neoquinophan.
Neurinase.
Novasurol.
Novatophan.
Optalidon.
Optinoktin.
Pentobarbital.
Pernocton.
Phanodorm.
Phenobarbital.
Phenobarbitone.
Phenoquin.
Phenylcinchoninic acid.
Phenyl-ethyl-barbituric acid.
Prominal.
Proponal.
Pyramidon.
Quadro-nox.
Quinophan.
Rutonal.
Salicylcinchoninic acid.
Sandoptal.
Sciatago.
Sedal.
Sinepan.
Somnacetin.
Somnifaine.
Somnifene.
Somnosal.
Sonalgin.
Soneryl.
Sulphonal; alky sulphonals.
Tetronal.
Theogardenal.
Theominal.
Theotone.
Tolysin.
Trigemin.
Trional.
Veramon.
Veronal.
Veronigen.
Veropyron.

GENERAL MEDICAL COUNCIL

SUMMER SESSION, MAY 26TH–29TH, 1936

AT the conclusion of the presidential address summarised in our last issue a vote of thanks to Sir NORMAN WALKER was proposed by Dr. Letheby Tidy and seconded by Mr. R. E. Kelly. Sir Robert Bolam was then elected chairman of business, and the Standing Orders were suspended in order that the Council might arrange to meet on Wednesday and Thursday mornings. An application from Mr. Sylvester Davidson Fairweather for the removal of his name from the Register as he had ceased to practise was agreed to. After deliberation in camera the President announced the restoration to the Dentists Register of the name of William McCulloch Lawson.

Cases Referred by the Dental Board

The Case of James Alexander Randolph Allison, registered as of 26, Seedhill-road, Paisley, "Dentist 1921," who had pleaded guilty and been convicted of fraud at the Greenock Sheriff Court on Dec. 11th, 1935, and sentenced to six weeks' imprisonment. He had not appeared nor been represented at the inquiry of the Dental Board. His name had been erased from the Dentists Register previously and the Council had consented to its restoration at the November, 1935, session. The Board recommended the erasure of his name again. He was not present. Mr. Harper, solicitor to the Council, explained the facts, and the President, after deliberation in camera, announced that the Registrar had been directed to erase Mr. Allison's name.

The Case of John Drain, registered as of 21, Albert-street, Alexandria, Dumbarton, "Dentist 1921," who had been sentenced at Woking on Feb. 22nd, 1936, to three months' imprisonment for embezzlement and theft from his employer. He had pleaded guilty. He had not attended the inquiry nor been represented, and the Board recommended the erasure of his name from the Register. Mr. Drain was not present nor represented. Mr. Harper laid the facts before the Council, which, after deliberation, decided to erase the name of Mr. Drain from the Dentists Register.

The Case of Lionel Richard Sanders, registered as of 350, High-road, Tottenham, London, N.17, "Dentist 1921," who had appeared before the Dental Board on the following allegations:—

1. You committed adultery with Gwendoline Lanston, a married woman, of which adultery you were found guilty by the decree of the Probate Divorce and Admiralty Division (Divorce) of the High Court of Justice, dated Dec. 17th, 1935, in the case of Sanders, Nora Silk *v.* Sanders, Lionel Richard, in which you were respondent. 2. The said Gwendoline Lanston was a patient of yours from July to September, 1933. Alternatively: 3. (*a*) By carrying on immoral and improper relations with Gwendoline Lanston at the premises 350, High-road, Tottenham, where you conducted your practice as a dentist; (*b*) by signing and giving to the said Gwendoline Lanston on Sept. 23rd, 1933, a receipted account purporting to be for professional attendance on her in order to conceal and dissemble your true association with her. And that in relation to the facts so alleged you have been guilty of infamous or disgraceful conduct in a professional respect.

The complainant was William Lanston.

The Dental Board had found the facts alleged proved to their satisfaction and recommended the erasure of Mr. Sanders's name.

Mr. Sanders attended, accompanied by Mr. Wynn Werninck, counsel, instructed by Messrs. Bein and Lawrence, solicitors. Mr. Werninck addressed the Council, questioning whether the admitted misconduct could be said to be in a professional respect. The association had begun before respondent knew the lady was married, and the professional receipt in evidence had been given only in an attempt to make the husband think she was a patient which in fact she was not. Mr. Winterbottom (solicitor to the Council) pointed out that the Dental Board had not made any pronouncement as to whether Mrs. Lanston was a patient or not.

After deliberation in camera the President announced that the Registrar had been directed to erase Mr. Sanders's name from the Dental Register.

Cases Referred from Previous Sessions

The Case (adjourned from May 30th, 1935) *of James Francis Patrick Devlin*, registered as of Old Chapel House, Richmond Hill, Leeds, 9, M.B., B.Ch. 1916, N.U. Irel., who had been summoned to appear before the Council on a conviction at Huddersfield in January, 1935, for being under the influence of drink to such an extent as to be incapable of having proper control of a car of which he was in charge.

The Council had found the charge proved and had postponed judgment for a year. Dr. Devlin now appeared, and had submitted the required testimonials as to his conduct in the interval. He repeated his apologies and his determination to act on the warning he had received. After deliberation in camera the President announced that the Council had decided not to erase Dr. Devlin's name.

The Case (adjourned from May 29th, 1935) *of William Graham*, registered as of Bridge House, Manor-road, Tynemouth, M.B., B.S. 1923, U. Durh., who had been summoned to appear before the Council as a result of various convictions for motoring offences. The charges had been found proved and judgment had been postponed for twelve months.

Dr. Graham appeared, accompanied by Mr. Oswald Hempson, solicitor, who put in the required testimonials and reiterated on behalf of his client his promise to abstain altogether from alcohol. He also drew attention to the serious punishments imposed by the court, which included disqualification for life from holding a driving licence. After deliberation, the President announced that Dr. Graham's name would not be erased.

The Case (adjourned from May 28th, 1935) *of Alexander Beck Cluckie*, registered as of 14, Gay-street, Bath, M.B., Ch.B. 1908, U. Glasg., who had been summoned to appear before the Council on account of convictions in the Bath City Police-court for drunkenness while in charge of a car and other motoring offences. The charge had been found proved and judgment postponed for a year. Dr. Cluckie now appeared, bringing seventeen testimonials, and reiterated his vow of abstinence. His name was not erased.

The Case (adjourned from May 30th, 1935) *of William Mervyn Crofton*, registered as of 22, Park-square, London, N.W.1, M.B., B.S. 1904, R.U. Irel.; M.D. 1911, N.U. Irel., who had been summoned on a charge (brought by the Medical Defence Union) of advertising by press interviews, public notices, and a speech to opticians. Dr. Crofton was not present and had not been asked to attend. The Council considered his testimonials in camera as they were only interim reports, final judgment having been postponed at the 1935 hearing for two years.

The Case (adjourned from May 29th, 1935) *of Oladipo Lahanmi*, registered as of 2, Levenshulme-road, Gorton, Manchester, L.M.S.S.A. Lond., 1932, who had been summoned to appear on charges of stealing microscopes from the Liverpool School of Tropical Medicine, for which he had been convicted and fined at the police-court. The charge had been found proved but the Council, in consideration of youth and other circumstances, had postponed judgment. Dr. Lahanmi now submitted the testimonials required of him and appeared. After deliberation the Council decided not to order the erasure of his name.

The Case (adjourned from May 29th, 1935) *of Samuel Patrick McGrath*, registered as of 54, Kinross-avenue, Worcester Park, Surrey, M.B., B.Ch. 1924, N.U. Irel., who had appeared on a charge of unprofessional conduct after convictions for driving a car under the influence of drink. Judgment had been postponed, subject to the usual provisos. Dr. McGrath appeared, accompanied by Mr. Oswald Hempson, solicitor, who produced testimonials and voiced his client's assurances for the future. Dr. McGrath's name was not removed.

The Case (adjourned from May 29th, 1935) *of Cecil John Rhodes Morrison*, registered as of c/o National Bank of India, 26, Bishopsgate, London, E.C.2, L.R.C.P. Edin., 1925; L.R.C.S. Edin., 1925; L.R.F.P.S. Glasg., 1925, who had been summoned to appear before the Council as a result of convictions for drunkenness. Dr. Morrison attended, with the testimonials that had been required of him, and the President announced that his name would not be erased

The Case (adjourned from June 1st, 1934, and May 28th, 1935) *of George Francis Donaldson Perrott*, registered as of 25, Bromefield, Stanmore, Middlesex, M.R.C.S. Eng., 1928; L.R.C.P. Lond., 1928, who had been summoned to appear before the Council on similar charges of drunkenness. Dr. Perrott attended, accompanied by Mr. Levy Teesdale, solicitor, who gave his client's assurance as to good conduct in future, and put in the testimonials asked for by the Council. Dr. Perrott's name was not erased.

New Penal Cases

CHARGES OF DRUNKENNESS

The Case of Alan Gray, registered as of 65, Mostonlane, Blackley, Manchester, M.B., B.S. 1925, U.Durh., who had been summoned to appear before the Council on the following charge:—

That you were convicted, after pleading guilty, of the following misdemeanour, viz., on Jan. 13th, 1936, at the Manchester City Police-court, of being under the influence of drink whilst in charge of a motor-car, and were fined £20 and 5*s*. costs and were disqualified for holding a driving licence for twelve months.

Dr. Gray was not present. Mr. Harper said that the Notice of Inquiry had been acknowledged by a Mrs. Gray, who had forwarded it to the respondent on a ship which was at sea. It was agreed to postpone the case.

The Case of John Muir MacKenzie, registered as of Hollymoor Mental Hospital, Northfield, Birmingham, M.B., Ch.B. 1921, U. Glasg., who had been summoned to appear before the Council on the following charge:—

That you were convicted, after pleading guilty, at the Birmingham Police-court of the following misdemeanours: (1) on July 29th, 1933, of being drunk, and were fined 5*s*. or seven days' imprisonment; (2) on Oct. 29th, 1934, of being drunk, and were fined 10*s*. or seven days' imprisonment; (3) on Nov. 2nd, 1935, of driving a motor-car whilst under the influence of drink, and were fined £10 and £1 16*s*. costs or 28 days' imprisonment, and were disqualified for holding a driving licence for 12 months.

Dr. MacKenzie appeared, accompanied by Mr R. A. Willes, counsel, instructed by Messrs. Barlow, Lyde and Gilbert, agents for Messrs. James Ore, Birmingham. Mr. Winterbottom laid the facts before the Council and read the evidence given by the police officers. Mr. Willes addressed the Council on Dr. MacKenzie's behalf, emphasising that the offence occurred when respondent was off duty, and that respondent had a remarkably high professional reputation and had recently obtained the D.P.M. Lond. and performed valuable research work. He called Dr. T. Yoxall, who said he had known Dr. MacKenzie for ten years, and testified warmly to his excellence as a man and a doctor. To witness's knowledge, respondent could not safely take any alcohol and had now become a teetotaller. Dr. MacKenzie also testified on his own behalf. After deliberation in camera the President announced that the charge had been found proved but judgment would be postponed for 12 months, subject to the usual provisos.

The Case of David Davidson Watson, registered as of 55, Corstorphine Hill-gardens, Edinburgh, 12, M.B., Ch.B. 1926, U.St.And., who had been summoned to appear before the Council on the following charge:

That you were convicted (1) of the following offence: on Dec. 2nd, 1933, at the Sheriff Court, Edinburgh, of driving a motor-car whilst under the influence of drink, and were fined £15; (2) of the following misdemeanour: on March 30th, 1936, at the Wakefield City Police-court, of being in charge of a motor-car whilst under the influence of drink, and were fined £20 and £2 1*s*. costs and disqualified for holding a driving licence for 12 months.

Dr. Watson appeared in answer to his Notice; Mr. Winterbottom laid the details before the Council, and Dr. Watson spoke on his own behalf, and said he had had no intention of driving the car and was not in it. He answered questions and gave his assurance for the future. Judgment was postponed for 12 months, subject to the usual provisos.

The Case of William Douglas, registered as of 282, Goldhawk-road, Shepherd's Bush, London, W.12, M.B., Ch.B. 1921, U.Edin., who had been summoned to appear before the Council on the following charge:—

That you were convicted of the following misdemeanours, viz.: (1) On March 19th, 1935, at Beaconsfield Police-court, of driving a motor-car whilst under the influence of drink (date of offence, Feb. 27th, 1935), and were fined £10 and £3 4*s*. costs, and disqualified for holding a driving licence for one year; and (2) on Dec. 30th, 1935, at the Bucks Quarter Sessions held at Aylesbury, of driving a motor-car whilst under the influence of drink (date of offence, Dec. 7th, 1935), and were sentenced to three months' imprisonment and disqualified for holding a driving licence for two years.

Dr. Douglas appeared, and Mr. Harper laid the facts before the Council. The respondent repeated the assurances of future good behaviour which he had already written to the Council, and judgment was suspended until May, 1937, subject to the usual provisos.

ALLEGED BREACH OF D.D.A. REGULATIONS

The Case of Joseph Hirschmann, registered as of 127, Maida-vale, London, W.9, M.B., B.Ch., 1920, U.Dub., who had been summoned to appear before the Council on the following charge:—

That you were on Feb. 28th, 1936, convicted, after pleading guilty, at the Marylebone Police-court (*a*) of failing to enter in register particulars of dangerous drugs

obtained from F. E. Dee, chemist (date of offence, August 31st, 1935); (*b*) of failing to enter in register particulars of dangerous drugs obtained from C. J. Hewett and Sons, Ltd., chemists (date of offence, Sept. 12th, 1935); and (*c*) of failing to enter in register particulars of dangerous drugs obtained from C. J. Hewett and Sons, Ltd., chemists (date of offence, Sept. 14th, 1935), contrary to the Dangerous Drugs (Consolidation) Regulations, 1928, and the Dangerous Drugs Acts, 1920–25, and were fined £50 and £10 10*s*. costs in respect of each of the three offences.

Dr. Hirschmann appeared, accompanied by Dr. Reginald Hearn, counsel, instructed by Messrs. Vivian J. Williams and Co.

Mr. Harper said that the police-inspector had said that the police had evidence that the respondent did not administer proper medical treatment to certain addicts under his care, but increased their doses. The charges concerned three separate quantities of morphine sulphate tablets: grs. 54, grs. 200, and grs. 144. The respondent had pleaded guilty. The Home Office had withdrawn his authorisation to use dangerous drugs, and had notified the Council.

Dr. Hirschmann gave evidence on his own behalf. He said that he had failed to enter the grs. 54 in his book because he had thought they were ordered by a prescription given to a patient instead of, as in fact they were, by an order to supply to himself. The grs. 200 had been sent him by mistake and had never been opened. He had failed to enter the grs. 144 through carelessness; it had all been given to a patient with rectal cancer shortly before operation. At the hearing before the magistrates his counsel had advised him to plead guilty as the offence was only a technical one. He had actually been carried into court, suffering from the effects of a severe motor accident. Instead of treating the charge as merely a breach of regulations, the magistrate had taken a serious view of it and had not only fined him fifty pounds and ten guineas costs, but demanded payment that day. The respondent had only complied with great difficulty. This unfortunate plea of guilty had made his appeal of no avail and deprived him of the right to reopen the case before the Council.

The Council, however, examined Dr. Hirschmann on the facts at considerable length. After an adjournment to enable him to fetch his books, he answered questions by the legal assessor, Dr. Bone, and other members of the Council relating to the entries about dangerous drugs. He gave details of the six addicts he had been treating at the material time. His books, he said, had been regularly inspected by the N.H.I. regional medical officer. He had never in his life started a case on morphia or heroin.

Dr. Philip Hamill testified to the good character of respondent and said the doses given were quite suitable for addicts of long standing, so far as his knowledge went.

After deliberation the Council did not see fit to order the erasure of Dr. Hirschmann's name.

CHARGES OF ADULTERY

The Case of Walter Edgar Masters, registered as of Old Hill House, Chislehurst, Kent, L.M.S.S.A. Lond., 1913; M.R.C.S. Eng., 1918; L.R.C.P. Lond., 1918; D.P.H. R.C.P.S. Eng. 1928, who had been summoned to appear before the Council on the following charge:—

That being a registered medical practitioner (1) you committed adultery with Hetty Elizabeth Sykes, a married woman, of which adultery you were found guilty by the decree of the Probate Divorce and Admiralty Division (Divorce) of the High Court of Justice, dated March 3rd, 1936, in the case of Sykes *v.* Sykes and Masters, in which you were the co-respondent; (2) you stood in professional relationship from March to December, 1933, with the said Hetty Elizabeth Sykes, who was a patient during that period at Old Hill House Nursing Home, Chislehurst, Kent, of which you were the medical officer. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

Respondent was not present.

Mr. Winterbottom explained the steps taken to acquaint Dr. Masters with the date of the inquiry and put in receipts for the registered letters sent to his only known addresses. The Standing Orders had been complied with and the Council, after deliberation in camera, decided to proceed with the case. Mr. Winterbottom put in a copy of the divorce decree and adduced facts in support of the professional relationship from the evidence in court of an employee of the nursing-home. He then called Mrs. Masters, who testified to her statutory declaration and the nursing home case-book. She said she had run the home for inebriates since her husband left her, as matron and proprietor; the case-book showed clinical notes in her husband's writing relating to Mrs. Sykes as a patient entering the home on March 20th, 1933, and the last entry being dated Dec. 14th.

After deliberation the Council decided to erase Dr. Masters's name from the Register.

The Case of David Gaston, registered as of 55, Bromley-road, Catford, London, S.E.6, M.B., B.Ch. 1914, Q.U. Belf., who has been summoned to appear before the Council on the following charge:—

That being a registered medical practitioner (1) you committed adultery with Queenie Grace Painter, a married woman, of which adultery you were found guilty by the decree of the Probate Divorce and Admiralty Division (Divorce) of the High Court of Justice, dated April 11th, 1935, and made absolute on Oct. 28th, 1935, in the case of Painter *v.* Painter and Gaston, in which you were the co-respondent; and (2) you stood in professional relationship from 1927 to 1934 with the said Queenie Grace Painter and her husband, Frederick Thomas Painter. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

The complainant was Mr. Frederick Thomas Painter.

Dr. Gaston attended, accompanied by Mr. J. C. Smuts, instructed by Messrs. J. and C. Dodd.

Mr. Winterbottom said the facts were admitted, and called complainant.

Frederick Thomas Painter testified to his statutory declaration, which said that his parents and family had been under Dr. Gaston's care before his marriage and up to 1934. In 1927 his wife went to the doctor professionally, but had not previously met him. Later the two couples became friendly and went about together. Throughout, the Painters remained Dr. Gaston's patients. The divorce proceedings had been defended by Dr. Gaston only on the question of damages. In cross-examination he said that if Mrs. Painter had met Dr. Gaston before 1927 it was without his knowledge.

Mr. Smuts addressed the Council, urging that the relationship with Mrs. Painter had started before respondent began practice in Catford and did not arise out of a professional introduction. The relationship had lasted eleven years and there was no suggestion of any other woman in respondent's life. All relationship with Mrs. Painter had now ceased and Mrs. Gaston was living with her husband. The adultery had only lasted for a year and respondent had ceased practice and left the neighbourhood to avoid any scandal on his profession. He had already

suffered heavily through divorce damages and loss of livelihood, and deeply regretted his offence.

After deliberation in camera the President announced that the Registrar had been directed to erase Dr. Gaston's name from the Register.

The Case of William James Woodward, registered as of Enfield Villa, Station-road, Billingham-on-Tees, Co. Durham, M.B., Ch.B. 1928, U.Glasg., who had been summoned to appear before the Council on the following charge :—

That being a registered medical practitioner (1) you committed adultery with Elizabeth Mott, the wife of Wilson John Mott, on various dates between August, 1933, and January, 1934, at 3, North-terrace, Stockton, at Billingham, and at High-street, Norton, your surgeries, and at 16, Balder-road, Norton, the residence of the said Elizabeth Mott and her family; (2) Miss Linda Mott, a daughter, and Gordon, a son of the said Mr. and Mrs. Mott, were patients of yours, and the said Mrs. Mott had occasion to call on you at your surgeries on behalf of and in relation to the health of her said daughter and her daughter's baby; (3) you arranged meetings and committed adultery with the said Elizabeth Mott at your said surgeries in order to conceal and dissemble your improper and immoral association with her. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

The complainant was Mr. Wilson John Mott.

Respondent was present, accompanied by Mr. W. A. Macfarlane, counsel, instructed by Messrs. Le Brasseur and Oakley, on behalf of the London and Counties Medical Protection Society.

Mr. Harold Darcy, solicitor, on behalf of the complainant, a relieving officer, said that at the end of the summer of 1933 respondent was in practice in Stockton in partnership. Arbitration proceedings between the partners came to a head at the end of the year and it became known to complainant that Mrs. Mott was being approached as a witness in these proceedings. Respondent was not the medical attendant of Mr. or Mrs. Mott, but his partner was the daughter Linda's panel doctor. Linda always lived with her grandparents. Mrs. Mott had visited the surgery about the girl and had there been told that the partner was not available and had been attended to by Dr. Woodward, then and on two subsequent visits. On the third visit respondent made improper advances, and misconduct occurred. He had asked if he might visit her at home. Thereafter visits had been exchanged frequently and messages had been sent by various hands. On June 13th, 1934, Mr. Mott had written to Dr. Woodward asking for an explanation of the frequent visits of which he had been unaware, and threatening to report the facts to the General Medical Council. The reply had been sent by the solicitors to the London and Counties Medical Protection Society and had denied the allegations, mentioning that a Mrs. Mott had already complained to the Council and the Penal Cases Committee had found no case to answer. Actually, said Mr. Darcy, it was not Mrs. Mott who had complained but her sister, who had had no business to interfere. On Feb. 18th, 1935, Mrs. Mott had visited the surgery with her sister to inquire about rumours that she had received a large sum of money from the doctor for some purpose in connexion with the arbitration proceedings. She had had a cold reception, and next day had had a letter from his solicitors asking her to discuss any matter with them and not with the doctor. Mrs. Mott had replied at once, and perhaps indiscreetly, using very strong language.

Mr. W. J. Mott testified to his statutory declaration and produced a medical certificate that one of his witnesses was unable to attend. He said he had been married 24 years and had three children. He had never seen Dr. Woodward until the previous day but the children had been on the panel of Dr. Woodward's former partner. The son's name had been removed from the panel at the request of Dr. Woodward in May, 1935, but witness had not understood why. "Words" with his wife had ensued and, in consequence of what she then said about the respondent, witness had written to the doctor and made a complaint to the Council.

Cross-examined, he agreed that his son Gordon had joined respondent's panel in January, 1935. The complaint of adultery and visiting ended with December, 1934. His daughter had been a panel patient of the partner and from time to time had been attended by respondent; she did not live with him. He knew nothing more about professional attendance on her in 1934. He had pressed his wife considerably to find why Gordon had been struck off Dr. Woodward's panel. He knew nothing of the complaint brought by his wife's sister; he had learned of it about the time he had made his own complaint. His wife had told him she had committed adultery with the doctor, but he had not mentioned adultery in his angry letter to the doctor. She had been "absolutely furious" with Dr. Woodward. Up to that time he had had no suspicions of his wife. In the previous year he had been to Mr. Watson, a solicitor, to try to find out about the arbitration case and what statement his wife had made. He had heard that allegations about his wife and respondent formed part of the arbitration case; his wife had asked if she might make a statement saying that Dr. Woodward had only called there by mistake, looking for Linda, and was not otherwise calling there. Later, he had got to know that suggestions of adultery with the partner were being made, but he had not consulted Mr. Watson about this or known of it at the time. He had, he admitted, asked Mr. Watson if he could take slander proceedings against the partner if the allegations proved untrue; but he had not asked if he could take divorce proceedings against him. He had treated the story of adultery with the partner as a joke. He did not know yet what had been said in the arbitration statements.

Re-examined, he agreed that his wife had told him a number of lies.

In reply to Mr. H. L. Eason, he said that at the material time no member of his family living in his house was a patient of Dr. Woodward's.

Mrs. Elizabeth Mott said that she had gone to the surgery in August, 1933, about Linda and had seen respondent, as his partner was ill. Respondent had known she was Linda's mother. She had gone again three weeks later for a bottle of medicine for Linda, at the afternoon surgery hour. He had kissed her, pulled her on his knee, and had connexion with her. She had become afraid but he had told her to stick to him and say what he told her to say. She had visited him dozens of times at the Billingham surgery in the evening; he had hung his overcoat on the door to cover the keyhole. He had sent messages by men and a little girl. In February, 1935, she and her sister had gone to the surgery in consequence of rumours and she had said: "This is my sister. Will you tell her I didn't get £300 for keeping my mouth shut?"

Cross-examined by Mr. Macfarlane, she said she said no more at that interview. She denied that she had committed adultery with the partner, but admitted that she had declared in writing that she

had done so, maintaining that respondent had told her to do so and assured her there never would be arbitration proceedings. She would not have sworn to this in oral evidence. She had not said at the county court that she wanted to "down" the partner. She admitted writing the letter to respondent in which she said: "Mr. Mott and neighbours say you have been with me, and I will. When you upset me you do it to the wrong one." She had gone to Mr. Watson to try to reopen the arbitration case because she objected to detectives inquiring about this letter. Money had never been mentioned in Mr. Watson's office. Certainly, she had been very excited. Mr. Watson had said: "What is your figure, Mrs. Mott?" She had said she was going straight to the partner. She had not accused any other doctors in the Stockton area of having intercourse with her. Her daughter Linda had never gone with her to see respondent during the pregnancy, or at any time before the baby was born in August, 1933. Respondent did not take his holidays in September; he was at the surgery. He had asked her to call again; he did not say why but she could guess. "If a man asks a lady to call again, she *can* guess, can't she?" This was the second time she had seen him, in the surgery, and nothing familiar had been said or done. Next time, intercourse took place in the Stockton surgery, in the basement of the partner's house. It was possible to see into the surgery from the area steps; there was no frosted glass. While intercourse took place there, two patients had been waiting in the adjoining waiting-room; in the afternoon. She had not been there longer than ten minutes in all. The next time the partner had entered through the communicating door from the house and again there had been patients waiting. The partner had said "sorry" and gone out again. After that, respondent had suggested coming to her home in the mornings, coming by car with a chauffeur four or five times. There was no patient of his in the house. She had another doctor. The neighbours had thought it very odd and she had told them the doctor came on Mr. Mott's business. Linda's baby had had a facial nævus but she had never been to the surgery with Linda about it; nor had he and she ever talked of the baby. In her statement she had emphatically denied any improper behaviour on respondent's part, but she had only signed it because he asked her to as a friend. She had written it and he had told her what to put. A large part of it was untrue. Mrs. Collins was willing to oblige witness by saying she had seen intercourse take place, though in fact she had not been there at all. Mrs. Woodward had never accompanied the doctor on his visits. Intercourse had sometimes taken place standing up at the desk and sometimes on the floor.

In reply to the legal assessor, Mr. Macfarlane explained the arbitration case. Respondent had been junior partner and there had been three surgeries. Differences had arisen from financial matters irrelevant to this case and from the charges of immorality in a professional respect made by Mrs. Mott against the partner. Respondent in April, 1934, had claimed arbitration with a view to dissolving the partnership. The partner had made cross-charges of slander against respondent in saying he (the partner) was unfit to look after patients, his prescriptions were no good, and he was going with women. In June and November further cross-charges of financial irregularities were added. The case was to be heard in December, 1934, but had been settled by counsel before hearing, and all allegations had been withdrawn. By this time Dr. Woodward had come to doubt some of the evidence which previously he had believed to be true. Mrs. Mott had repeatedly come to the surgery to pass on bits of gossip about the arbitration allegations, and had asked the solicitor not to write to her as she did not want her husband to know.

Mrs. Alice Collins testified to having waited for Mrs. Mott outside the surgery on several occasions. In January, 1935, she had told respondent to behave himself with Mrs. Mott. He had asked, "Do you believe all she says?" and witness had said "Yes." She had seen his car go to Mrs. Mott's house and been there when he had called.

Cross-examined, she denied that Mrs. Mott was dissatisfied with the result of the arbitration and admitted telling the solicitor that the partner had committed adultery with Mrs. Mott twice in her presence but on the second occasion she had been careful not to look. These statements were all lies. In answer to the legal assessor she said that Mrs. Mott had suggested that she should concoct the story about the partner for the arbitration proceedings.

Mrs. Hilda Nicholls, sister of Mrs. Mott, said she had complained to the Council in 1935, and the committee had found the charge groundless. She confirmed her sister's account of the visit to the surgery in January, 1935, and of the visit to Mr. Watson.

After deliberation in camera, without calling on counsel, the President announced that the facts alleged had not been found proved.

CONSIDERATION OF THE CURRICULUM

The final report of the Curriculum Committee on the best means of improving the training of medical students was presented to the Council and after discussion at three morning sessions was finally adopted without much change. An interim report [1] had been presented a year ago, on which the licensing bodies and medical schools were asked to give their observations; and a second interim report [2] was laid before the Council last November dealing with these observations, and was also circulated to the licensing and teaching bodies. Observations were made by the Minister of Health, the special committee on medical education appointed by the B.M.A., and the council of the section of radiology of the Royal Society of Medicine, and a memorandum was received from the General Council of the Trade Union Congress. The final report was drafted after considering all these opinions.

ADMISSION TO THE CURRICULUM

There was general, though not unanimous, agreement (said the Committee) with the opinion that students should not enter upon the medical cirriculum proper before the beginning of the term in which they attain the age of 18 years, and the Committee recommended that the present minimum age of 17 years should be altered. It also considered that the Council would be justified in inviting the licensing bodies to decide either to require registration of medical students or to encourage it officially. The Committee agreed with the widely expressed opinion that the general education of the student should not cease at too early an age, and consequently recommended that at the pre-registration examination, which at present consists of scientific subjects, one or two subjects of general education should be taken at a standard higher than that of the preliminary

[1] THE LANCET, 1935, i., 1403.
[2] Ibid., 1935, ii., 1425.

examination. As, however, this rule would impose great practical difficulty on students who enter universities, university colleges, or medical schools before receiving instruction in pre-registration scientific subjects, the report recommended that it should not apply to such students.

PRE-CLINICAL STUDIES

The existing resolutions provide that a minimum period of three years shall in every case be available for study after the student has completed his professional examinations in anatomy and physiology. Several licensing bodies, the Committee reported, hold their professional examinations at the end of the fifth term, and the sixth term is often occupied by a course of instruction in clinical methods and physical signs which students must attend before they can be appointed clerks or dressers. Such courses are also commonly held before admission to clinical appointments by licensing bodies which hold their professional examinations at the end of the sixth term. The Committee expressed the opinion that such courses, while valuable and necessary if no such instruction has been given, have not effected an association between the professional scientific subjects and the clinical subjects, or removed the block between the two divisions of the medical curriculum proper. It accordingly recommended that the period of study of the professional scientific subjects should be two years, and that throughout the second year instruction should be given designed to effect the association which is desirable between the subjects of the two periods. In outlining the methods which it recommended, the Committee made clear by the form of the draft resolutions that it did not intend that instruction and examination in systematic medicine and pathology should be given at this period. In laying down what the courses in human anatomy and human physiology should include, it recommended that instruction should be given in the elements of clinical examination, including physical signs, the use of the stethoscope, ophthalmoscope, and similar instruments, and the examination of body fluids; normal reactions of the body to injury and infection as an introduction to general pathology and bacteriology; and an introduction to pharmacology. This instruction should illustrate that given in anatomy and physiology and introduce later studies. It is to be arranged jointly by the teachers of anatomy and physiology and the teachers of the clinical subjects throughout the second year, and the amount of time given to it should be approximately one-third of the total time available in that year.

PERIOD OF CLINICAL STUDIES

Some licensing bodies had expressed the view that residence in hospital was unnecessary where ample clinical material was available. The Committee, however, thought that experience could be gained during residence which would not otherwise be regularly obtainable. The resolution concerning the midwifery course had been amended to specify more clearly the nature of the certificate of attendance on cases of labour which should be given to students. There was no change in the number of cases which should be attended—viz., twenty, of which the first five at least should be attended in the lying-in hospital or ward.

DR. TIDY INTRODUCES THE REPORT

Dr. H. LETHEBY TIDY, chairman of the Curriculum Committee, moved that the report be received and entered on the minutes. The Committee had, he said, interpreted its terms of reference widely, and where it had decided that some alteration should be made in the Medical Acts it had not hesitated to lay its views before the Council. General of normal health was now regarded as one of the most important aims of the medical profession, and the Committee considered that throughout the whole period of study the students' attention should be directed to the importance of the measures by which they could assess or maintain normal health, and the principles and practice of the prevention of disease. Speaking of the length of the curriculum and the belief that it was overloaded, Dr. Tidy remarked that in the medical schools at which a considerable proportion of the students qualified the present length of the curriculum was five years. It could therefore clearly be completed by students who were below the standard of supermen. The proposed changes should not require any increase in length. On the other hand, it had been argued that the curriculum was overloaded with unnecessary subjects, and the question was, what were those subjects. As medicine progressed, some subjects receded in importance and others advanced. It was, however, difficult to name subjects that could be omitted. When pressure was brought to bear on the Committee it was always for the insertion of a new subject, never for the dropping of an old one. Many people were glad to welcome a reduction in the time spent on someone else's subject.

There had, said Dr. Tidy, been a wide demand from the profession and the public for an increase in the standard of general education. If there were really more qualified doctors than the public needed, it was reasonable that the standard of entry should be raised to eliminate the weakest. There actually appeared to be a need for a rise in the standard. The present admission examination, however, was passed at school at 16½ years or earlier, and if the standard were raised these young students would be intensively crammed and the quality of the candidates would not be improved. The better plan was to aim at prolonging the general education, and the Committee proposed to require a higher standard in some subjects of general education taken at the same time as chemistry and physics in the pre-registration days, except for those who took chemistry and physics after leaving school. No doubt this left a loophole, but schoolmasters would probably not be anxious to avoid this reasonable requirement.

SIR HENRY BRACKENBURY SUPPORTS IT

Sir HENRY BRACKENBURY, seconding the motion, said that the new proposals, speaking generally, recognised a new outlook on medicine. The introduction of such subjects as genetics, psychology, and methods of maintaining health was a step in the direction desired by nearly everybody engaged in medical work. He retained, however, serious doubt whether the two ends of the curriculum would be as good as they ought to be. At the beginning he doubted whether the Committee was going as far as it should. There was probably no serious opposition to the view that not only the general education but also the preliminary scientific studies should be advanced farther than the previous minimum. How far depended on the Council's conception of what medicine included. They had clearly advanced farther than the idea of medicine as a study of certain pathological processes. Sir Henry defined the science of medicine as the practical application to the human

sphere of the sciences of life. If the medical student were entering a profession which was to be the leading spirit in guiding humanity to complete mental and bodily health, he must have a higher degree of preparation than most other students. Sir Henry still considered that biology ought to be a pre-registration subject, and expressed anxiety about the whole of the two years between 16 and 18. If in certain fundamental directions the mind was not trained at 18 years of age, he said, it never would be trained. The Council must therefore pay great attention to the actual content of the training at the time the student entered upon the medical curriculum proper.

DISCUSSION IN THE COUNCIL

A long debate followed, every section of the report being debated separately, including an appendix which showed the new draft resolutions with the proposed alterations marked by a marginal rule.—Dr. E. P. CATHCART wished to abolish completely the training in chemistry and physics in schools for those students who were going on to medicine.—Mr. L. P. GAMGEE thought that instruction in the sciences should be started early and continued without a break.—Dr. DAVID WATERSTON desired to see a further extension of clinical studies. He strongly deprecated the proposal to make the recommendations for pre-registration examinations general all over the country until the Council had ensured that it was within the power of the licensing bodies to adopt the curriculum.

Dr. J. W. BONE remarked that the Committee had introduced a large number of new subjects into the curriculum, many of them of extreme importance. Moreover, the content of the old subjects had been materially increased. There was great danger that the Council would be challenged for putting too many requirements into the new rules. The present curriculum was overloaded, and therefore the proposed curriculum was doubly overloaded. Portions of the old curriculum should have been jettisoned if new matter must be introduced.

Dr. E. K. LE FLEMING warned the Council against losing sight of the wood for the trees. He was still conscious of having learned many things as a student which had helped him to pass his examinations but not to do anything else. The object of the curriculum should be to send out into the country men well equipped to practise general medicine and surgery. Nowhere in the curriculum was this aim suggested. Each specialty and the method of teaching it was well thought out, and great progress had been made in the linking of specialties together, but nowhere did the draft express the idea that the medical curriculum should be devoted to turning out good general practitioners. It had taken the Council 20 years to realise the importance of the National Health Insurance Acts and the obligations which they put upon the panel doctor. Midwifery was likely to pass wholly into the control of the local authorities and become institutionalised, and the political and social problems which had brought this condition about might be traced to inadequate instruction of students in former years. This had been due to the fact that the teachers had not been familiar with the conditions under which the general practitioner would have to carry out the work.

Mr. R. J. JOHNSTONE retorted that all the midwifery teachers whom he knew had ample experience, not only of the conditions in which midwifery was being practised in every class, but also of the practice of difficult midwifery under the same conditions as those in which the general practitioner practised ordinary midwifery.

Mr. A. W. SHEEN suggested that the debate had served the useful purpose of stirring up the anatomists and physiologists. Teachers of clinical subjects had constantly found that they had to teach anatomy and physiology which the students should already have known. The most important suggestion in the report was the new interlocking of the second-year professional and scientific subjects with the clinical period. He agreed with the principle of applied culture. Life was short, and the education of a doctor could be directed without neglecting the cultural aspect. There were other important factors apart from the curriculum, such as the selection of students, place where they were taught, the provision of teaching, and the choice of teacher. Vaccination should be included with immunisation as a general subject and not given a place by itself. The curriculum would not be overloaded, especially if the students were prevented from wasting their time in operating theatres.

Mr. H. L. EASON said that the University of London could not agree to the raising of the age of entry to 18. Its matriculation examination admitted to every other faculty as well as that of medicine, and the student who had matriculated was entitled to take up his studies. To make an exception of the medical student would be impracticable, and a hardship to poor parents whose anxiety was that their son should earn as soon as possible. He also feared that the present medical graduate was losing sight of the three main branches of medicine. No less than 19 specialties were mentioned by name as essential. If only a fortnight were given to each of them they would occupy the best part of a year to the detriment of the study of the three main branches. He hoped that the inclusion of specialties would be left to the licensing bodies.

THE REPORT ACCEPTED

Dr. TIDY, in reply, reminded the Council that efficient doctors were produced under the present resolutions. The modern medical graduate was the best there had ever been, but the Council's duty was, if possible, to turn out a better one. It was untrue that the new resolutions would add a year to the present curriculum. If they had that effect, the licensing bodies were not carrying out the present resolutions. Overloading did not come from the resolutions but from over-teaching.

The report was received and entered on the minutes, and the draft curriculum table was discussed in detail. Textual amendments were made, and Dr. Tidy accepted an amendment by Mr. Eason, on behalf of the Association of Anæsthetists, deleting the requirement that the student should administer ten anæsthetics and substituting the requirement of "a course of theoretical and practical instruction in the administration of anæsthetics." Sir Henry Brackenbury could not persuade the Council to make biology a pre-registration subject. He also moved a long amendment to ensure that the student should: (1) have passed his general schools or matriculation examination and afterwards his examination in chemistry and physics as at present required; (2) continue his general education during the first two years of the curriculum; and (3) study biology seriously during those two years. This amendment was seconded by Dr. Sydney Smith, but after considerable debate it was rejected. The Council, however, amended the heading "Pre-registration Examinations" to "Pre-registration Requirements."

PUBLIC HEALTH CONGRESS IN EDINBURGH

(FROM OUR SCOTTISH CORRESPONDENT)

THE Lord Provost presided at the joint Congress of the Royal Institute of Public Health and the Institute of Hygiene, held in Edinburgh from May 26th–30th, and in his opening address gave the views of a layman on the problems of rheumatism. After the inaugural meeting the congress divided into sections.

STATE MEDICINE AND INDUSTRIAL HYGIENE

Sir THOMAS OLIVER, in opening this section with an address on the Foes of Industrial Hygiene, referred to the importance of fatigue in relation to accidents, and dealt with the harmful effects of emanations from radio-active bodies, and of dust containing substances such as white lead. He related how, by the use of sesquisulphide of phosphorus, the manufacture of lucifer matches had ceased to be regarded as a dangerous trade.—Dr. A. MASSEY (Coventry) spoke of the scientific selection of employees. He emphasised the necessity for health education of the workers concomitantly with other measures, and agreed with Sir Thomas Oliver that fatigue was often a precursor of accidents, as of mental and physical illness.—Dr. G. E. OATES (Paddington) read a paper on the Housing Act, 1935.—Dr. E. K. MACDONALD (Leicester) spoke on the Place of the Medical Officer of Health in the Administration of the Municipal Hospital. Far too little use he thought had been made of the facilities afforded under Section 13 of the Local Government Act of 1929.—Dr. CHALMERS WATSON (Edinburgh) read a paper on the Clamant Call for Changes in Medical Education, and at the close of the discussion a resolution was adopted by the meeting to the effect that the medical curriculum should include more specific training in preventive medicine, and urging the General Medical Council to revise the courses accordingly.—Dr. C. WHITE (Port of London) gave an account of the detection of faulty canned foods.—Dr. F. E. CHESTER-WILLIAMS (Bradford), speaking on Public Authorities and Cancer, urged the provision of more and better facilities for the treatment and care of cancer patients in all stages of the disease.

WOMEN AND CHILDREN AND THE PUBLIC HEALTH

Prof. JAMES YOUNG, taking as the subject of his address the Rôle of the General Practitioner in Obstetric Practice, suggested that there would be increasing openings for those with special training and qualifications as consultants and specialists under the municipal schemes, and referred to the directions in which the general practitioner might find his greatest usefulness in the future.—Dr. JAMES DUNLOP (Glasgow) spoke in favour of domiciliary midwifery, with a doctor in attendance at every confinement, and Dr. J. A. STEPHEN (Aberdeen) set but the conditions necessary for a satisfactory midwifery service.

Dr. MARGARET BALFOUR dealt with statistics as to the amount of money available for food among the poorer classes, and showed that there was much need for the provision of suitable nourishment for expectant mothers.—Dr. G. W. THEOBALD (London) considered the physical condition of the nation, and suggested that the toxæmias of pregnancy provided a key by means of which many of the problems concerning nutrition could be unlocked. Not only must a sufficient sum per caput be available for the purchase of food, but the population must be re-educated in its dietary habits. The problem was twofold—cultural and economic. The physician, he remarked, was not a politician, but he himself could not escape from the conviction that something was radically wrong with a system which admitted of poverty in the midst of plenty.

Dame LOUISE MCILROY in her presidential address on Sociological and Medical Aspects of Abortion spoke against the widening of legal facilities for the practice of abortion and dealt with the social conditions which had led to the present propaganda in that direction. Suggesting remedies for the present state of affairs, she said that birth control was the lesser of the two evils, but child bearing should be looked on as a valuable contribution to the State and made as safe and easy as possible. Conditions of life must be adapted to motherhood and proper provision made for the mother.—Anæmia of Pregnant Women of the Working Class in Aberdeen was the subject of a paper by Dr. H. W. FULLERTON and Prof. L. S. P. DAVIDSON (Aberdeen). In their investigations it had been found that anæmia was very common in infants between 9 months and 2 years, and in women of the reproductive age in the poorer classes. They considered a deficiency in iron-rich foods, such as animal protein and vegetables, to be the cause of the anæmia.

Prof. A. J. BALLANTYNE (Glasgow), speaking on present-day problems of eyesight in school-children, deprecated the practice of discouraging higher study, or the choice of a professional career, solely on the presence of high myopia. The greatest wrong that could be inflicted on the high myope was to curtail his education. He urged that ophthalmic examination should begin before the present commencement of school life.

TUBERCULOSIS

Dr. L. S. T. BURRELL in a presidential address dealt with susceptibility to tuberculosis at various ages and the protection conferred by a mild infection. Although a mild infection did confer some slight if variable protection, a massive infection would produce the disease in the tuberculin reactor as well as in the non-reactor. The greatest source of infection was always the sputum-positive patient.—Dr. P. M. D'ARCY HART (London) referred to the spread of tuberculosis which followed the introduction of the disease into virgin soil in native races, as was seen among the Senegalese troops in Europe in 1914–1918. Such an outbreak might, he feared, occur in Abyssinia unless care was taken about the living conditions of natives in proximity to Italians.—Dr. GEOFFREY TODD (Midhurst) said that collapse therapy had added some years of expectation to life in patients with tuberculosis. But successful treatment still depended much on the patient's confidence in his doctor and in the institution where he was being treated.—Dr. ANDREW MORLAND (London) spoke of the risk taken by tuberculous patients in giving up a sedentary occupation for a strenuous outdoor job, and the wear and tear involved in travelling to and from work the extra distance to have the benefit of fresh air. He advocated adequate midday meals and guidance for the patient how he should spend his leisure hours.—Dr. C. D. S. AGASSIZ (London) spoke on pulmonary tuberculosis in children, and Dr. GEORGE H. DAY (Mundesley) on the part played by the general practitioner in the treatment of tuberculosis.

RHEUMATISM

Dr. F. J. POYNTON, president of the section dealing with Rheumatism and Allied Diseases, opened a discussion on the Treatment of Chronic Rheumatism. In the same section Dr. C. W. BUCKLEY (Buxton) read a paper on the Spa, and Dr. W. S. C. COPEMAN and Mr. T. J. O'REILLY (London) spoke on the work of the British Red Cross Clinic for Rheumatism.—In a paper on Rheumatic Heart Disease in Childhood, Dr. H. L. WALLACE (Edinburgh) laid stress on the high incidence of rheumatic disease in childhood. He considered that the child suffering from rheumatic heart disease was the victim of wanton neglect on the part of the community. He had found that 25 per cent. of all rheumatic children died from heart disease before they left school, while a further 30 per cent. were crippled by heart disease for the remaining part of their lives. The ideals to be aimed at were two—the easing of the burden which had to be borne by the cardiac cripple, and the prevention of rheumatic heart disease occurring at all.

MEDICINE AND THE LAW

The Burden of Proving Insanity

IN Sodeman *v.* the King (on May 28th) the Judicial Committee of the Privy Council declined a somewhat optimistic invitation from Australia to vary the legal rules of the criminal responsibility of the insane. The prisoner was convicted of murdering a girl aged 6½ years in circumstances of brutality. He took her for a ride on a bicycle, strangled her, tied up her body in a curious way, stuffed some of her clothing into her mouth, and left her for dead. He had committed three similar murders, all characterised by identical method. His appeal from the death sentence was rejected by the full court of the State of Victoria, and the High Court of Australia refused him leave to appeal to the Privy Council. His application to the Privy Council last week for special leave to appeal was one of a kind which the Judicial Committee in Downing-street does not welcome. The judges of that supreme tribunal do not regard themselves as a Court of Criminal Appeal; they refuse to re-hear cases without the advantage of having seen the witnesses; the grounds on which they interfere in criminal proceedings are severely limited.

The appellant's complaint was that the trial judge had misdirected the jury as to the burden of proof; he had also directed them on delusions, whereas the accused had no delusions but merely a mind which could not resist doing these meaningless acts. His counsel pressed for the enlargement of the "rules in McNaghten's case"; he desired to engraft the further rule that, where a man knew that he was doing what was wrong, he might none the less be insane if he was caused to do the act by an irresistible impulse produced by disease. Counsel had to admit that English decisions do not go so far; but he urged that, since some earlier dicta suggested that such an additional rule might exist, this was a good opportunity for settling the point uniformly for the whole Empire. The Lord Chancellor, in dismissing the petition, answered that such a course would result in different standards being set up in England and the Dominions; the decisions of the Court of Criminal Appeal in England (e.g., Rex *v.* Flavell and Rex *v.* Kopsch) would remain unaltered. Lord Hailsham added a few words on the alleged misdirection at the trial with regard to onus of proof. The trial judge had apparently told the jury that the Crown had to prove its case beyond reasonable doubt, but that the burden of proof in the case of insanity rested on the accused. Sodeman's counsel argued that the jury might have wrongly understood that the burden on the accused was as heavy as the burden on the Crown. Lord Hailsham observed that the burden of proving insanity on the part of the defence was not so onerous as the burden of proof resting on the Crown. It was no higher than the burden which rested on plaintiff or defendant in civil proceedings. The courts below were agreed that the language of the trial judge was not such as to be misunderstood by the jury or as to be capable of misleading them. The Judicial Committee would therefore not exercise the "very exceptional jurisdiction" reserved to it in criminal cases.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A HOSPITALS ASSOCIATION FOR IRELAND

ON the occasion of the recent sweepstakes draw on behalf of the hospitals of the Irish Free State a meeting was held of representatives of nearly all the hospitals in the Irish Free State and some in Northern Ireland for the purpose of founding an Irish Hospitals Association. In the report of the Hospitals Commission attention was drawn to the need for such an organisation in order to encourage coöperation between the several hospitals. Dr. G. J. Moorhead presided at the meeting which was held at the Royal College of Surgeons on May 25th, and he consented to accept the presidency of the new association. The choice is a fortunate one, for to many years' experience as a hospital physician he is able to add a considerable experience as a hospital governor. Dr. J. P. Brennan was appointed honorary secretary, and a small provisional committee was appointed to frame a draft constitution and report to a second meeting of hospital representatives to be held in the autumn. It is intended that the membership of the association should be open both to institutions and to individual governors or members of medical staffs, and to rate-supported institutions as well as to voluntary hospitals. The provisional committee contains several public representatives as well as governors of voluntary hospitals and members of honorary staffs.

THE CAMBRIDGE DIPLOMA IN RADIOLOGY

THE diploma in medical radiology and electrology is the only one granted in Cambridge that can be obtained by persons who have not resided or taken courses in the University. It was established in 1919 for a period of five years, and it has been prolonged from time to time on the ground that there was no other satisfactory alternative. It appears that 397 candidates have obtained the Cambridge diploma since its inception, while the total for all the other diplomas in medical radiology is less than 80, and the general board of the University are of the opinion that as long as this diploma is granted under the present conditions there is little likelihood of any other diploma in the subject becoming successfully established. In order that facilities for the lectures, practical instruction, and examinations may be provided elsewhere, they have decided not to continue the present arrangements indefinitely. Allowing enough time for plans to be made that will carry on the traditions and standards of the Cambridge diploma, the board have recommended that this shall no longer be given after October, 1941.

PARLIAMENTARY INTELLIGENCE

EDUCATION BILL: PROPOSED MEDICAL INSPECTION

IN the House of Commons on May 26th, during consideration of the Education Bill on report, Mr. EDE moved an amendment to ensure that an employment certificate should be granted to the intended employer of a child if the issuing authority (the local education authority) were satisfied, after consultation with the local committee for juvenile employment, if any, and after consideration by the medical officer of the health and physical condition of the child, that the employment would be beneficial to the child. A similar amendment was, he said, inserted in committee of the Scottish Education Bill, making it a requirement that the consideration of the health and physical well-being of the child should be undertaken by the medical officer. If the clause were left as vague as it now stood, it would be possible for the consideration to be purely perfunctory. His amendment would ensure that expert evidence would be available for the committee advising the local authority.—Mr. COVE seconded the amendment.—Mr. OLIVER STANLEY, President of the Board of Education, said that he had every sympathy with the desire to see that the medical facts in each case were properly considered, but the amendment would give local authorities no powers that they did not already possess. Any authority could tell its medical officer exactly what part he had to take in the consideration of these exemptions. They had to assume that local authorities were anxious to carry out their duties properly. The school medical history, as it was now kept, after the recent Circular of the Board of Education with a view to coöperation with the Juvenile Employment Committee, would in the majority of cases give the local authority the information that it required. It contained specific reference to the suitability of a child for certain categories of employment, and a good many of the questions which the local authority might ask would be covered by the existing machinery. In any case, where there might be doubt, the school medical service was at the disposal of the authority, and he felt that the matter might be left there.—The amendment was negatived by 238 votes to 121.

Mr. MORGAN JONES moved an amendment limiting the hours of work of exempted children to not more than 40 a week, and providing that they should not be before 8 A.M. nor after 6 P.M. He said that the revelations of Sir John Orr had recently directed attention to the very serious condition of the children of the country, both in schools and elsewhere, and in particular to the physicial condition of those children. For children of 14 to 15, eight o'clock was sufficiently early to be at work and six o'clock sufficiently late. How could young people avail themselves of opportunities for physical recreation unless their hours of work finished, at least, at six?—Sir PERCY HARRIS seconded the amendment.—Sir DONALD SOMERVELL, Attorney General, said it was open to a local authority to set a standard even higher than that set in the amendment, if it so desired, in the case of any particular child or group of children. On the other hand, it would be quite wrong, once the House had approved the principle of exemptions for beneficial employment, to introduce a rigid provision with regard to hours of work which would rule out of consideration certain employments which might well be beneficial, but in which the hours of work would be greater than 40 per week. The Government had promised to bring in during the next year, a Factory Bill, laying down the hours of work for children from 14 to 18, or whatever ages the House might decide. Local authorities might be trusted properly to administer the Bill. They were given a direct pointer by the House to consider hours of work as one of the factors which must be taken into account. The Factory Bill would be the proper measure in which to consider hours of work. The Factory Bill would be discussed in the House before the present Bill came into operation.—Mr. R. J. TAYLOR said that the two-shift system was being worked in the North of England and the little boys would go to work in the mines till one or two o'clock in the morning.—The amendment was negatived by 220 votes to 126.

Mr. STANLEY secured agreement for an amendment to ensure that an employer should allow facilities to properly authorised officers of local education authorities to carry out inspections. This would enable the authority to satisfy itself that the employment had not, by reason of any change in the conditions of the employment or, for any other reasons, ceased to be beneficial to the child.

Mr. ORR-EWING moved an amendment to ensure that before granting a certificate exempting a child from school attendance for six months or longer, the issuing authority should require an undertaking from the parent or guardian of the child that a medical certificate would be produced reporting on the health of the child during the fourth month of employment. He said that the amendment supplied the means by which the local authority could ascertain whether the employment for the child had or had not been beneficial. A child who had received a certificate of exemption from school, and had gone into employment, might suffer a state of semi ill-health owing to the novelty of the situation having worn off by something like the fourth month, when the natural condition of the child would become apparent. If the employment was to last for a longer time than six months, which one might call the exempted period, the fourth month would be about the right time for the medical test to be made to ascertain if the child had suffered any ill-health because of the employment. He would have liked the child to be medically examined at school at the same time as the children who had not been exempted were being medically examined, so that some fair comparison could be made. Under the terms of the financial resolution that unfortunately could not be done. Anyone who had had experience of the employment of children in industry must be aware of many cases in which a normally healthy child had found its way into a type of employment which had affected either its body or its mind adversely. In such cases it would be greatly to the benefit of the child if it could be removed from that particular employment.—Lieut.-Commander AGNEW seconded the amendment.—Mr. STANLEY said that while he fully sympathised with the object of the amendment the method it proposed was unworkable. It put the obligation on the parent to get a certificate from the doctor, but they could not expect a parent, who would receive no reimbursement for his expenditure, to get a thorough examination of a child. The sort of certificate which the parent would obtain under such a system would hardly be worth the paper it was written on. He agreed that they ought to follow up these children, and not merely decide that the employment was suitable for their health at the beginning. He had already taken the proper step at the moment by inserting a provision in the undertaking to give access to any properly constituted authority for the purpose of inspection. They might, at a later stage, discuss with local authorities how an eye could be kept on the future health of these children and what steps could be taken if it became apparent that a particular job was proving detrimental to health. There was the further promise that the age of National Health Insurance would be lowered.—The amendment was by leave withdrawn.

On May 27th the Bill was read the third time.

NOTES ON CURRENT TOPICS

Adjournment for Whitsuntide

BOTH Houses of Parliament adjourned on Friday, May 29th, for the Whitsuntide recess. The House of Lords will reassemble on June 11th and the House of Commons on June 9th.

Vivisection of Dogs

In the House of Commons on May 28th Mr. RADFORD presented a petition signed by more than 6000 citizens of Manchester praying the House to pass a Bill to prohibit the vivisection of dogs.

Bronchitis and Tuberculosis in Wales

In reply to questions put to him by Mr. JAMES GRIFFITHS, the Minister of Health gave the mortality-rates from bronchitis and tuberculosis in the year 1935 in certain administrative counties of Wales, along with comparative rates for England and Wales.—The following is the answer :—

BRONCHITIS, 1935			TUBERCULOSIS (ALL FORMS), 1935		
Mortality (provisional) per million living					
England and Wales	..	388	England and Wales	..	718
Carmarthen	..	362	Carmarthen	..	955
Glamorgan	..	577	Pembroke	..	1022
Monmouth	..	498	Glamorgan	..	893
Brecknock	..	397	Monmouth	..	825
			Brecknock	..	812
			Cardigan	..	1283

Family Budgets

In the House of Commons on May 28th Mr. ASTOR asked the Minister of Labour whether he was now in a position to state the names of the members of the committee which was to advise on the methods to be adopted in the collection by means of family budgets of information as to working-class expenditure.—In reply Mr. E. BROWN stated that the following have been appointed to be a committee to advise the Minister of Labour as to the methods to be adopted in the collection of information by means of family budgets, showing the approximate average weekly expenditure of working-class families on the items which should be taken into account in the construction of index numbers, designed to measure the percentage changes from month to month in the cost of maintaining a present-day standard of living :—

Mr. F. W. Leggett, C.B., Principal Assistant Secretary, Ministry of Labour (chairman); Mr. J. N. Beckett, Assistant Secretary, Ministry of Health; Mr. F. J. Blakemore, O.B.E., J.P., Past President of the National Chamber of Trade; Prof. A. L. Bowley, Sc.D., F.B.A., Professor of Statistics, University of London; Mr. H. Crow, O.B.E., Principal, Scottish Office; Mrs. W. Y. Darling, wife of Councillor W. Y. Darling, Edinburgh; Mrs. C. S. Ganley, J.P., L.C.C., a member of the Management Committee of the London Coöperative Society; Mr. J. Hallsworth, representing the Trades Union Congress General Council; Dr. J. M. Hamill, O.B.E., M.D., D.Sc., Senior Medical Officer, Ministry of Health; Mr. C. T. Houghton, Assistant Secretary, Minister of Agriculture and Fisheries; Mr. W. A. B. Iliff, M.B.E., Assistant Secretary, Ministry of Labour, Northern Ireland; Mr. D. Caradog Jones, M.A., Lecturer in Social Statistics, University of Liverpool, and Director of the Social Survey of Merseyside; Mr. Kenelm Kerr, O.B.E., representing the National Confederation of Employers' Organisations; Mr. E. C. Ramsbottom, O.B.E., Director of Statistics, Ministry of Labour. The Secretary to the Committee would be Mr. J. G. Cannell, Ministry of Labour, Queen Anne's Chambers, Broadway, Westminster, S.W.1.

HOUSE OF COMMONS

WEDNESDAY, MAY 27TH

Food-supply in War Time

Captain GUNSTON asked the Minister for the Coördination of Defence how the problem of food-supply in time of war was to be divided between the subcommittee of the Committee of Imperial Defence and Sir William Beveridge's subcommittee.—Sir T. INSKIP replied: The subcommittee which has been appointed under my chairmanship is examining all aspects of our food-supply in time of emergency. They include, for example, home production, the protection of shipping, security in ports, distribution and transport questions, and reserve stocks. The reference to Sir William Beveridge's subcommittee is limited at the present stage to the consideration of arrangements for rationing the supply to the individual consumer in case of necessity, and of the preparatory steps which might be taken to enable such arrangements to be brought into force as quickly as possible.

Decline in Milk Consumption

Mr. ALEXANDER asked the Minister of Agriculture whether he was aware of the decline in the consumption of liquid milk in three out of the four months of 1936 for which figures were available, and that, but for the fact that there were 29 days in February this year, the figures for the complete four months would show a heavy decline in liquid consumption for milk compared to 1935; and to what extent this decline was due to the higher retail prices for milk on account of the successive increases in contract prices.—Mr. RAMSBOTHAM, Parliamentary Secretary to the Ministry of Agriculture, replied: After making allowance for the extra day in February this year, sales of milk by wholesale for liquid consumption in the first four months of 1936 show a decline of approximately one million gallons, or about half of one per cent. compared with the corresponding period in 1935. As to the last part of the question, the minimum appropriate retail prices were the same this year as last.

Drug Addicts

Mr. ARTHUR HENDERSON asked the Home Secretary whether his attention had been called to the report of the opium section of the League of Nations, stating that there were 30,000 confirmed drug addicts in this country; and whether he could make a statement on the matter.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: My right hon. friend's attention has been drawn to a statement in the press that there are 30,000 drug addicts in this country. This statement is wholly unfounded. It purports to be based on a report of the opium section of the League of Nations Secretariat, but I am informed that this report contained no such statement. I may add that, according to the information available in the Home Office, the number of addicts known to the authorities does not exceed 700.

Mr. HENDERSON: Could the hon. gentleman give the House any information as to whether the traffic is on the increase or otherwise?

Mr. LLOYD: Our information is that such traffic in this country is very small indeed, and in any case is confined to London; and even there it is very small.

Cancer Mortality

Mr. LAMBERT asked the Minister of Health the average mortality from cancer for each decennial period since 1850, and the mortality for the last five available years respectively.—Sir KINGSLEY WOOD replied: The standardised mortality-rates per million persons in England and Wales from cancer for the periods specified in the question are as follows :—

Year.			Mortality-rates per million.	Year.			Mortality-rates per million.
1851–60	..	..	326	1921–30	..	..	991
1861–70	..	..	396	1930	..	..	1003
1871–80	..	..	484	1931	..	..	998
1881–90	..	..	610	1932	..	..	1001
1891–1900	..	..	767	1933	..	..	997
1901–10	..	..	867	1934	..	..	1003
1911–20	..	..	928				

THURSDAY, MAY 28TH

Diphtheria Immunisation

Mr. SEXTON asked the Minister of Health whether he was satisfied that inoculation against diphtheria was such a proved success as to warrant advising compulsory

use.—Sir KINGSLEY WOOD replied: I am satisfied that artificial immunisation against diphtheria is based on sound scientific principles, and has proved of value, but I should not be prepared to advise that its use should be made compulsory.

Health Conditions in Schools

Viscountess ASTOR asked the President of the Board of Education, in view of the importance to the welfare of school-children of school premises having good ventilation, heating, water-supply, sanitation, and playgrounds, he would cause a survey to be made of all school premises in county areas, in order to furnish information as to the number of school premises, provided and non-provided, respectively, in which unsatisfactory conditions obtained in any or all of the following respects: supply of water for drinking or for lavatory purposes; sanitary arrangements and cloakrooms; lighting, natural and artificial; ventilation; playgrounds; and damp walls and other structural disrepair.—Mr. OLIVER STANLEY replied: The development of reorganisation, to which the Board have called attention in Circular 1444, will during the next two years necessitate a survey of school premises from the point of view of the part which they are to play in the schemes for their districts. A survey of this nature will, I hope, achieve all the results the noble lady has in mind.

Puerperal Fever: Quarantine of Midwives

Mr. SEXTON asked the Minister of Health whether he was satisfied that the period of quarantine enforced on a midwife after attending a case of puerperal fever was long enough to ensure safety in attending succeeding cases.—Sir KINGSLEY WOOD replied: The period of suspension in these cases is that laid down in the rules made by the Central Midwives Board, and I have no reason to suppose that it is insufficient.

Rehousing Accommodation

Mr. DAVID ADAMS asked the Minister of Health whether he proposed to issue a publication, with typical plans of large houses containing four and five bedrooms, for the assistance of local authorities in connexion with their statutory duty to provide suitable alternative accommodation under the terms of the Housing Act, 1935, for large families at present living under overcrowded conditions.—Sir KINGSLEY WOOD replied: The question raised by the hon. Member is at present under consideration. In the meantime, my department have type plans of large houses which are available for the guidance of local authorities.

Mental Hospital, Barnsley: Maintenance Charges

Mr. POTTS asked the Minister of Health the statutory authority under which the Barnsley magistrates had recently made an order requiring a man to contribute towards the support of his married daughter who happended to be an inmate of a mental institution, and who was also supported by her husband.—Sir KINGSLEY WOOD replied: I presume that the magistrates' order was made under the authority of Section 19 (2) of the Poor Law Act, 1930. That subsection enables public assistance authorities to obtain, on complaint to a petty sessional court, orders of maintenance upon the relations liable to manintain a poor person, and the father is included, by Section 14 of the Act, among the relations so liable.

The League and Red Cross Organisations

Mr. MANDER asked the Secretary of State for Foreign Affairs, in view of the fact that the members of the International Red Cross committee were entirely of Swiss nationality, he would ask the council of the League of Nations to discuss how far it was desirable for the League to recognise as genuinely international a body so constituted, having particular regard to Article 25 of the Covenant, under which reference was made to the League's relations with the Red Cross organisations.—Viscount CRANBORNE, Under-Secretary for Foreign Affairs, replied: While my information is that the hon. Member is correct in stating that the International Red Cross Committee is entirely composed of Swiss citizens, I understand that the status and functions of that body, as defined in Article 7 of the statutes of the International Red Cross organisation, make it clear that it is an independent institution having its own statute and particular functions. This position is no doubt well recognised by other members of the League, and I do not therefore think that action by H.M. Government such as is suggested is required.

Prison Warder and Blood Transfusion

Mr. THURTLE asked the Home Secretary whether he was now in a position to say anything regarding the case of Warder J. Jelly, of Wandsworth prison.—Sir J. SIMON replied: On the morning of a day on which this officer was due to perform duty as a trade instructor he stated that he had undertaken to attend at St. James's Hospital to give a blood transfusion and applied for leave to be absent from duty from 11 to 12 for this purpose. His application was made without previous warning, and as the absence without notice of an officer detailed for essential duties seriously disorganises the arrangements for the custody and employment of prisoners, he was told that he was not entitled to commit himself to an engagement during his hours of duty. The governor explained the position to the hospital authorities by telephone, and on learning that it would be difficult to obtain a substitute at short notice the governor agreed, as an exceptional case, to allow Officer Jelly to absent himself from duty in order to attend at the hour named. The officer, on being so informed, then refused to go, but I understand he subsequently attended the hospital during the dinner hour. On the following day he addressed to the Prison Commissioners a letter of protest couched in such terms that they could only regard it was insubordinate and as indicating that the officer did not appreciate his special responsibilities as trade instructor. In view of the terms of this letter the Commissioners decided that he should no longer be employed as trade instructor, but should revert to discipline duty. The officer has since been interviewed at his own request by a Commissioner and an Assistant Commissioner of prisons; but after reviewing the matter in the light of his representations the Commissioners have found no reason to modify their original decision.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 23RD, 1936

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1868; diphtheria, 920; enteric fever, 36; pneumonia (primary or influenzal), 909; puerperal fever, 39; puerperal pyrexia, 129; cerebro-spinal fever, 22; acute poliomyelitis, 4; acute polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 16; ophthalmia neonatorum, 100. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 29th was 5344, which included: Scarlet fever, 1055; diphtheria, 1251; measles, 1788; whooping-cough, 611; puerperal fever, 21 mothers (plus 13 babies); encephalitis lethargica, 285; poliomyelitis, 1. At St. Margaret's Hospital there were 30 babies (plus 13 mothers) with ophthalmia neonatorum.

Deaths.—In 122 great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 48 (23) from measles, 3 (1) from scarlet fever, 32 (11) from whooping-cough, 25 (0) from diphtheria, 46 (17) from diarrhœa and enteritis under two years, and 40 (8) from influenza. The figures in parentheses are those for London itself.

No great town reported more than 2 deaths from measles. There were 7 deaths from whooping-cough at Liverpool, 3 at Birmingham. Deaths from diphtheria were reported from 20 great towns, not more than 2 from any. The only fatal case of typhoid was at Cardiff.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 42 per 1000 total births), including 42 in London.

OBITUARY

THOMAS ARTHUR HUGHES, M.D., Sc.D. Dub., F.R.C.P. Lond.

LIEUT.-COLONEL, I.M.S.

Colonel Hughes's many friends in India and this country will have read with deep regret the announcement of his death at an English sanatorium on May 23rd. He had been in poor health for the past few years but had refused to give up his work until it became physically impossible for him to carry on any longer. Owing to a severe exacerbation of his lung trouble he was compelled to take leave about two months ago.

Thomas Arthur Hughes was born in 1884 in Co. Armagh, a son of the late Mr. P. Hughes. He was educated at Blackrock School and Trinity College, Dublin, where he won many prizes, and on qualifying M.B., B.Ch. in 1909 he became assistant in the physiological department. He entered the Indian Medical Service in July, 1910, and took the D.P.H. in the following year. Three years later he became captain and acted as medical officer of the 24th Punjabis, gaining the experience which led him to write on the nature of pulmonary tuberculosis and of cirrhosis of the liver as seen in the Punjab. He served in the European War of 1914–18, and in 1920 he was appointed to the chair of physiology at King Edward Medical College, Lahore, and four years later professor of clinical medicine and medical superintendent of the Mayo Hospital. Shortly before he left India he was appointed to the post of principal and professor of medicine.

Sir John Megaw writes: "Although Hughes had a very high reputation as a physician, his leanings were chiefly towards medical research and he made valuable contributions to the *Indian Journal of Medical Research* on pulmonary tuberculosis in adult punjabis as well as on cirrhosis of the liver and diseases of the heart. He was a man of attractive personality and high ideals. He neglected opportunities of making money by private practice but never spared himself when attending to his hospital patients, teaching his students, or carrying out a piece of research. His premature death was undoubtedly due to his high sense of duty."

Colonel Hughes leaves a widow, who was with him throughout his illness, and two children—a boy of 10 and a girl of 5.

JOHN THOMAS HEWETSON, M.D. Edin., F.R.C.S. Eng., F.C.O.G.

Dr. Hewetson, whose death took place on May 19th, was born at Hornsby Gate, near Carlisle, in 1872, and educated at Edinburgh University and London, taking the degree of M.B. at Edinburgh, and subsequently becoming M.D., F.R.C.S., and F.C.O.G. He commenced his private practice in Coventry, but did not remain long in general practice, and whilst still resident in Coventry he commenced research work at the General Hospital, Birmingham. He was a man of outstanding ability and came under the eye of Sir Gilbert Barling, who invited him to become his assistant, and thus started for him what was a fine experience in general surgery before he specialised in the branch of surgery to which he later devoted his life. He was appointed assistant obstetric officer at the General Hospital in April, 1903, and held the appointment for five years until he resigned in 1908. In 1907 he joined the honorary staff of the Maternity Hospital and in 1908 he accepted a similar appointment at the Women's hospital at Sparkhill. From 1933 to the time of his death he was chairman of the Medical Board at the Women's hospital and senior surgeon.

A colleague writes: "A great surgeon and a master of his art, cool-headed, he was able to exercise remarkable self-control and was never ruffled in the operating theatre, where he treated everyone with courtesy, tact, and consideration. These qualities, allied to his personal charm, endeared him to all with whom he came in contact. His hospital work was always his first consideration and he never allowed his remunerative practice to interfere with the very extensive amount of work he did in an honorary capacity at the hospitals. He was beloved by all, particularly those best able to see and appreciate his great services to humanity. Although he did a colossal amount of work, his organisation was such that he was invariably on time for all his appointments—a rare quality in one so fully occupied.

"He was a great lover of sport, particularly football and cricket, and a practical supporter. He was a member of the Committee of the Warwickshire County Cricket Club from 1922 to 1926, from which latter date he has been a vice-president of the club."

FREDERICK DENYS CREW, M.B. Camb.

Dr. Frederick Crew, who died on May 25th, succeeded his father Dr. John Crew in practice at Higham Ferrers some 20 years ago, the family connexion with the practice being therefore a very long one. He was educated at Felsted, proceeded to Cambridge, and received his medical education at Guy's Hospital, where he graduated in 1906; shortly afterwards he went into partnership with his father, whom later he succeeded as medical officer for the borough of Higham Ferrers. During the war as an officer in the R.A.M.C. he served for a year in Mesopotamia, and he took a close interest in ambulance work, lecturing for the St. John Ambulance Association. He was only 57 years at the time of his death, which followed a short illness. He leaves a widow and two sons.

THE LATE PROF. FRIEDRICH KRAUS

EIGHT years ago when Friedrich Kraus reached his seventieth birthday the German medical press contained graphic sketches of a man who was recognised by his colleagues everywhere as the outstanding medical genius of his time. One of these[1] was from the pen of Prof. G. v. Bergmann. His recent death has brought us the following appreciation from Prof. J. Plesch, another of his co-workers.

"I see him," Prof. Plesch writes, "his enormous head with its clever forehead covered by a crumpled felt hat, a smile irradiating the whole of the broad reddish face, his long beard roving over his large paunch, his square stumpy-fingered hands, like those of the most productive thinkers—standing at the door of the Charité, when he was called in 1903 to the directorship of the foremost clinic in Germany. . . He irradiated a natural dignity which was entirely lacking in sternness, and nothing but goodwill beamed from his little pig-like eyes. He was an amiable conversationalist, interested in everything with an unlimited scope due to comprehensive knowledge. Yet he had a receptive talent, but not of that sponge-like variety which absorbs ideas only to return them, when pressed, practically unchanged. His mind was receptive to everything, and he received and absorbed information and ideas in such a way that when he

[1] Deut. med. Woch., 1928, liv., 859.

reproduced them his brain had moulded them into forms so different that they hardly showed a trace of their origin. His mind was in fact synthetic rather than analytic. Such was Freidrich Kraus as I knew him.

"Kraus was born in Austria at Bodenbach in 1858—the best vintage year of German clinicians, for it produced not only Kraus, but Krehl, Müller, and von Noorden. His father was a poor pensioner who died of a progressive paralysis; in spite of this handicap, throughout his long life Kraus was nevertheless physically and psychically unaffected. He presented himself to the world in a 'breech posture,' and used to say that he had maintained this attitude consistently throughout his life. His students days were spent at the University of Prague, where he lived in the hospital whose damp walls are responsible for the polyarthritis which he developed in his hands and feet while still in early youth. He never lost this deformity which so impaired his dexterity that he could hardly percuss.

"Thanks to his early studies in biochemistry and physiological anatomy at Prague, Kraus was well prepared to enter the clinic of Kahler, who later became a neurologist and, working with Charcot in Paris, in due course summoned Kraus to be his assistant. At this time Kraus's clinical knowledge was not great, but Kahler personally directed his early and necessarily simple clinical investigations. Two years later Kahler obtained a professorship in Vienna and took Kraus with him. In less than a year, however, Kahler died of cancer of the tongue, and at the early age of 28 Kraus had to take over his clinical teaching work. In spite of his youth he was considered as a possible successor to the chair of Skoda and Bamberger in Vienna. Though he was unsuccessful in the competition, it was a compensation to become chief physician in the famous Rudolf Hospital, where he remained for five years until he was promoted to a chair at the University of Graz, which he held until 1903. On the death of Karl Gerhardt in Berlin, Althoff—that reformer of the German universities—took the bold step of including after the names of L. Krehl and F. Müller that of the still young Kraus as one of the nominees for the vacant chair. Kraus was appointed, and continued his work as a leading teacher and professor of the German physicians until 1929, when he became emeritus. He was, for about fifteen years, chairman of the Berlin Medical Society, and his good-natured, pointed, and spirited comments were always eagerly awaited at the meetings. Empiricism had little place in the scientific method by which he built up his clinic. His attitude was experimental, and therefore largely based on positive facts. He was vividly interested in every new method and system that developed during this period when thought and methods in medicine, as in all the sciences, were undergoing far-reaching changes.

"Kraus was not one of those clinicians who, in the minds of his successors, would remain associated with one specific idea or method. This did not and does not mean that he was ever unstable, unsound, or incapable of making a deep impression upon his pupils and collaborators. On the contrary his spirit and his attitude of mind will long remain effective in medicine through the thousands of those who were privileged to work with him and under his tutelage. He did much pioneer work and carried out many new investigations which heightened the reputation of the clinic. Immediately upon their discovery he realised the great possibilities which lay in the medical use of X rays, and his clinic was the first in the world to have a fully equipped X ray laboratory attached to it. From this it naturally followed that his pupils were amongst the first to carry out important radiological investigations. Kraus also early introduced Einthoven's electrocardiograph into his clinic, and with his pupils he explored the new field of knowledge which this opened up. Such men as Schaudinn, Wassermann, and Ehrlich were delighted to come to his clinic; Pappenheim developed here the hæmatology of Ehrlich, and, when psychoanalysis had not even aroused its earliest antagonisms, Kraus made Freud and Jung welcome. Many celebrated biochemists worked in his laboratory: it was Kraus who early recognised the great clinical importance of Haldane's and Zunz's work on gas-metabolism, and he was the first clinician to use their methods, in the work by which he is best known, 'Fatigue as a Measure of the Constitution.' It may truly be said that under the guidance of this master some of the most important devices in many branches of medicine as we know it to-day made their earliest and perhaps most significant progress.

"It is almost impossible adequately to record the full tale of the many different activities which were influenced by his spirit during his fifty years as teacher and research worker. However, when it is remembered that the true scientific development of modern medical knowledge took place in his lifetime, and that he was alive to and interested in all that was going on around him, it is more possible to form a general idea of the immensity of his brain, and the greatness of his achievement. It is then not surprising that he never became one-sided in spite of the intensive character of his medical knowledge. With the development of his clinic and the increasing sphere of his influence, he became as it were a stronger and stronger focus which collected rays emanating from each and every source. It was only natural for such a man to turn from the pathological, anatomical, morphological, and topical mode of thought to the physiological-pathological, to the functional diagnosis. At the end of his life he gave us a sublimation of his thought, which was at the same time his apologia, in his 'Syzygiology, the Pathology of the Person,' containing ideas which have influenced and directed medical thought in the past and will do so in the future.

"Except for the arthritis already referred to, he was never really ill in his life, although he never took a holiday—not even a Sunday; neither did he take any exercise—not even so much as a daily walk. His whole life was devoted to his professional duties and to medical research, until at last he had the misfortune to break his leg, became decubital, and died of sepsis. He was not only a great teacher, he was also a great doctor, and not the least factor in making him so was the nobility of his character. His personality in the sick-room had a tonic effect, and gave him an enormous psychological influence over the patient. He was the most consulted physician of his time on the continent of Europe, but he treated 'the prince as a peasant, and the peasant as a prince.' His manner was gentle and modest, but nothing could equal his pride when, as the representative of professional knowledge, he spoke ex cathedra. His pupils are to be found all over the world to-day, among them being many British doctors who came to sit at his feet in Berlin."

JOINT TUBERCULOSIS COUNCIL: REPORTS OF COMMITTEES.—At a recent meeting of this council a report of the pneumothorax committee was discussed and adopted for presentation to the Medical Research Council. The committee agreed to report again on the extended reference: "To investigate and report on the results of artificial pneumothorax and how these may be improved." Dr. C. O. Hawthorne made a verbal report on behalf of the milk committee. The new order on milk designation, coming into force on June 1st, recognised tuberculin-tested milk and pasteurised milk. The other grade was accredited milk, or Grade A under another name; "the name," he said, "continues to reassure the public, although by no admitted standard can milk so labelled be regarded as safe." A recent inquiry by the People's League of Health had shown that, while to the majority of children in elementary schools pasteurised milk was being supplied, a substantial minority was receiving unprotected milk—i.e., raw milk of Grade A. Hence the continuing need for educational efforts to enable the public to distinguish between safe milk and milk which claimed merely to be clean.

CORRESPONDENCE

"ALLEGED DYE DERMATITIS"

To the Editor of THE LANCET

SIR,—I have received a pamphlet through the post entitled Interim Report on Alleged Dye Dermatitis Position. It relates that a committee representing colour makers and users has met ten times and collected a large amount of information and has decided to try and find a case which would enable them to obtain a Court of Appeal decision on idiosyncrasy not being included in the term "reasonably fit" of the Sales and Goods Act, 1893. It has been estimated this would cost £3000, which it is proposed to spread over the dye using and making interests. Three dermatologists, one in London, one in Leeds, and one in Manchester, have been "recommended" by this committee. It is also reported that "it has also been suggested that one firm of solicitors should be appointed to handle all cases, but this suggestion is strongly objected to in many quarters." The Alleged Dye Dermatitis Committee should, they say, be given authority and financial backing to fight any suitable case which is reported to it, and it should endeavour to get its point of view distributed to the professions by means of journals such as *The Lancet* and the *Analyst*.

It is a little difficult to appreciate this communication at its full value. I conceive it possible that dermatologists apparently committed in advance to a fixed outlook on "alleged dye dermatitis" would find difficulty in convincing a court of their entire freedom from bias in their approach to any case. My three colleagues will no doubt share my regret that the distribution of the £3000 is not to fall with impartiality upon all practising dermatologists. I am sure they themselves are not party to the suggestion that their other colleagues are less wide awake to the problems of idiosyncrasy. I would not suggest their cognisance of this pamphlet. It is well that skin specialists who are in a position to sign certificates of dye dermatitis should know what they may be up against. I have no doubt they will, as in the past, deal with each case on its merits according to their knowledge and experience.

It is stimulating to know that any one of us in practice may, without prevision, sign the test certificate on which will rest the case on which the Court of Appeal may hear our cross-examination on idiosyncrasy in all its bearings.

I am, Sir, yours faithfully,

Harley-street, W., May 29th. W. J. O'DONOVAN.

AIR MINISTRY AND VENEREAL DISEASE

To the Editor of THE LANCET

SIR,—In these days, when a large reserve of civilian pilots is desirable, everything possible should be done to encourage young men to take out flying certificates and to renew their private pilot's licence. Yet heading 6 (*b*) of the Air Ministry's medical renewal examination (C.A. Form 61) puts the question: "Has suffered from venereal disease?" Now, as a venereologist, I have had several patients who very greatly object to this question. They express the opinion, which I think is sound, that if since the last medical examination for their flying licence they have contracted venereal disease and have completely recovered, so that no clinical or pathological signs of infection remain, they should not be required to put on record that they have had venereal disease. This question has prevented more than one young man from renewing his licence. During 1917, when at home after becoming a casualty, I was in charge of an officers' V.D. hospital. Nearly three-quarters of my patients were officers of the Royal Flying Corps and several were most distinguished officers of that most distinguished corps—Mars and Venus were ever closely associated. As soon as clinical symptoms and often (in the case of syphilis) before pathological symptoms had cleared up they were returned to their squadrons. In my opinion question 6 (*b*) is unnecessary and should be deleted.

I am, Sir, yours faithfully,

H. WANSEY BAYLY,
Late acting Lt.-Col., R.A.M.C.(T.).

Harley-street, W., May 29th.

PROGRESS IN RADIOTHERAPY

To the Editor of THE LANCET

SIR,—On page 1228 of your last issue Dr. Schiller, referring to the radiological treatment of carcinoma of the cervix, says "Improvement in X ray or radium therapy is not possible with ordinary apparatus, which to-day is at its maximum efficiency. An improvement of radiotherapy might be obtained only by applying stronger or more efficient rays." It is, perhaps, worth while mentioning that advances in radiological treatment are more dependent upon the ideas and methods of radiologists than they are upon the mechanical efficiency of any apparatus. One would have liked to think that the conception, that only by applying stronger radiation would better results be obtained, was relegated to the past. Does Dr. Schiller think that the fundamental observations gleaned during the last few years at the Strangeways Laboratory on "optimum intensities" have no bearing on future practice, or that the search for methods of rendering tumours more sensitive to radiation is not as much warranted as indulgence in stronger and stronger radiation?

I am, Sir, yours faithfully,

Barnato Joel Laboratories, May 29th. SIDNEY RUSS.

BADGES FOR DOCTORS' CARS

To the Editor of THE LANCET

SIR,—During last month the secretary of the National Motorists Association, Mr. Charlton Elliott, addressed a circular letter to the medical profession on the subject of a special badge to be affixed to the motor cars of doctors. That letter contains a paragraph purporting to describe an interview with me, which I quote below:—

"Dr. Anderson, Secretary to the B.M.A., agreed with the Association's suggestion that, if it is found that the scheme is working satisfactorily on these lines, they would be pleased to consider giving official recognition at a later date, but they would, for the present, have to confirm in the *Medical Journal* the stand they had adopted in the past when this question had been put forward by medical men themselves, many of whom will have noted that THE LANCET, the same week, announced their approval of the scheme."

This is an entirely inaccurate account of what took place. In March last a statement appeared in a Sunday newspaper that a circular dealing with the issue of Red Cross motor car signs to doctors "will be issued through the British Medical Association." Exception was taken by me to this misleading statement, and in response to my protest the acting editor informed me that the statement was made on the authority of Mr. Charlton Elliott. Mr. Elliott subsequently came to see me on March 19th, and I

interviewed him in the presence of the Deputy Medical Secretary. At this interview it was made plain to Mr. Elliott that the British Medical Association had, after careful consideration, rejected the proposal that special badges should be supplied or approved for use on doctors' motor cars. Indeed, Mr. Elliott stated that if the British Medical Association was unfavourable to such a proposal it would be dropped. This represents the full substance of the interview, and the suggestion in Mr. Elliott's letter that I indicated that approval might be regarded as merely delayed is completely unfounded.

On April 4th Mr. Elliott sent me a copy of the badge which it was proposed to issue to doctors. In reply I wrote as follows:—

"I have no observations to make upon the design. As I explained at our interview the medical profession has no desire to have a special badge for doctors' motor cars."

This letter eliminates any possibility of misunderstanding as to the attitude of the British Medical Association, and I accordingly deemed it my duty to publish the true facts lest members of the medical profession should be misled by this circular letter.

I am, Sir, yours faithfully,

G. C. ANDERSON,
Medical Secretary, B.M.A.

B.M.A. House, Tavistock-square, W.C., June 3rd.

FOTHERGILL TESTIMONIAL FUND

THE following is the sixth list of subscribers to the testimonial to Dr. E. Rowland Fothergill received in response to the letter published in the *British Medical Journal* and *The Lancet* of Jan. 18th.

Amount previously acknowledged, £1466 17*s*.
Wiltshire Panel Committee, £25; S. D. Bhabba (London), £1; Reading Panel Committee, £5 5*s*.; Stoke-on-Trent Panel Committee, £10 10*s*.; H. C. Bristowe (Bristol), £1 1*s*.; Wakefield Panel Committee, £1 11*s*. 6*d*.; Newport Local Medical and Panel Committee, £2 2*s*.; H. Newsome (near Bristol), 5*s*.; N. Flower (Yeovil), 10*s*. 6*d*.; R. St. J. Kemm (Cheddar), 10*s*.; Drs. Cameron, Collins, and Pearce (Taunton), £1 1*s*.; J. Evans (Knowle), 5*s*.; E. B. Hinde (Norwich), £1 1*s*.; Annie Hyatt (Shepton Mallett), 5*s*.; East Riding of Yorkshire Panel Committee, £10 10*s*.; H. R. Unwin (Yeovil), J. E. Scales (Radstock), and B. A. Crook (Timsbury), each 5*s*.; Brighton Public Medical Service, £10 10*s*.; K. J. Atkinson (Halstead), 5*s*.; W. A. Gornall (Nailsea), £1 1*s*.; E. M. Redman (Bristol) and J. M. Dupont (Frome), each 5*s*.; Doncaster Local Medical and Panel Committee, £1 1*s*.; Smethwick Medical Society, £3 3*s*.; E. G. D. Pineo (Langford), 5*s*.; Rochdale Panel Committee, £10; Sheffield Panel Committee, £40; Croydon Panel Committee, £5 5*s*.; East Ham Panel Committee, £8 6*s*. 6*d*.; Warrington Local Medical and Panel Committee and Southend Local Medical and Panel Committee, each £5 5*s*.; G. Pollock (London), 10*s*. 6*d*. Total £1619 16*s*.

In accordance with the decision conveyed in the previous announcement the Fund has now been closed.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. J. C. Souter to *President* for Medical Dept., Admiralty.

Surg. Lt. J. Lees to *Effingham*.

A. G. K. Heberlein entered as Surg. Lt. (D) for short service and appt. to *Victory* for R.N. Hospl., Haslar, for course of instruction.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Comdr. R. Hall to *Royal Sovereign*.

Surg. Lts. to be Surg. Lt.-Comdrs: R. Cormack and M. Godwin.

ARMY MEDICAL SERVICES

Cols. N. E. Dunkerton, D.S.O., late R.A.M.C., and P. J. Hanafin, D.S.O., late R.A.M.C., retire on ret. pay.

Lt.-Cols. J. E. Ellcome, from R.A.M.C., and H. H. Blake, O.B.E., from R.A.M.C., to be Cols.

ROYAL ARMY MEDICAL CORPS

Majs. E. F. W. Grellier and G. D. Jameson to be Lt.-Cols.

Short Service Commissions: Lts. (on prob.) restd. to the estabt.: D. Wright, and C. P. Stevens; Lts. (on prob.) confirmed in their rank: J. McN. Lockie, and J. H. Caverhill; Lt. (on prob.) F. J. Hebb resigns his commission.

ROYAL AIR FORCE

Wing Comdr. A. F. Rook to Central Medical Establishment, London, for duty as consultant in medicine.

Squadron Leaders J. Magner to R.A.F. Hospital, Cranwell, for duty as medical officer; R. G. Freeman to R.A.F. Depôt, Uxbridge, for duty as medical officer.

The undermentioned are granted short service commissions as Flying Offrs. and to Medical Training Depôt, Halton: J. R. R. Jenkins, V. D. Jones, R. M. Outfin, J. H. Neal, R. H. Pratt, D. G. Smith, S. G. Gordon, J. C. Bowe, G. P. Jones, and J. G. Rountree.

Flying Offr. F. Courtin ceases to be seconded to the Royal Victoria and West Hants Hospital.

DEATHS IN THE SERVICES

Lt.-Col. WILLIAM CAMPBELL, who died on May 24th at Walton-on-the-Hill in his 86th year, was born in Edinburgh, where he obtained his medical degree in 1872. He took a commission in the Army in September, 1874, and was surgeon to the Scots Guards in 1881 and surgeon major to the Grenadier Guards in November, 1887, reaching the rank of surgeon lt.-col. in 1894. He served in Egypt in 1882 and retired in June, 1897.

Appointments

EVANS, K. A., L.R.C.P. Irel., has been appointed First Assistant Resident Medical Officer at Birch Hill Hospital, Rochdale, and Medical Officer in Charge of Antenatal and Postnatal Clinics.

GAVIN, F. W., M.D. Edin, D.P.H., Medical Officer for Penrith Urban and Rural areas.

HARRISON, J. G., L.R.C.P. Edin., Senior Resident Medical Officer at the City Hospital, Chester.

MOODIE, WILLIAM, M.D. St. And., F.R.C.P. Lond., D.P.M., Assistant Physician in the Department of Psychological Disorders in Children at University College Hospital.

London Homœopathic Hospital.—The following appointments are announced:—

HUGHES, D. M., M.B., F.R.C.S., Hon. Consulting Surgeon;
BARRY, GERALDINE, M.S. Lond., F.R.C.S. Eng., Hon. Surgeon; and
DODD, HAROLD, Ch.M. Liverp., F.R.C.S. Eng., Hon. Assistant Surgeon.

Births, Marriages, and Deaths

BIRTHS

BUTLER.—On May 24th, at Sutherland-avenue, W., the wife of Dr. Eric N. Butler, of a son.

DAY.—On May 22nd, at Chapel Field East, Norwich, the wife of Dr. George Day, of a son.

HOSFORD.—On May 27th, at Stormont-road, Highgate, the wife of R. W. P. Hosford, F.R.C.S. Eng., of a daughter.

JAQUES.—On May 24th, at Burnham, Buckinghamshire, the wife of Harold M. Jaques, M.R.C.S. Eng., of a son.

MCKINSTRY.—On May 23rd, at Gunterstone-road, W., the wife of Dr. W. K. McKinstry, of a daughter.

MOWAT.—On May 24th, at Kampala, Uganda, the wife of Allan Mowat, F.R.C.S. Edin., of a daughter.

TANNER.—On May 30th, at Newton Abbot, the wife of Guy M. Tanner, M.B. Camb., of a son.

WORTHINGTON.—On May 22nd, at Warwick, the wife of Dr. C. L. Worthington, of a daughter.

MARRIAGES

SLOT—LEWIS.—On May 29th, Gerald Slot, M.D. Lond., to Mary Lewis, of 2 Wellington House, Regent's Park, N.W., daughter of the late Mr. and Mrs. J. A. Munton, of Idle, Yorkshire.

DEATHS

BOLUS.—On May 26th, suddenly, at Queensberry House, Richmond, Surrey, Harry Boulcott Bolus, M.D. Camb., aged 68.

CAVERS.—On May 26th, Francis Cavers, D.Sc. Lond., M.R.C.S. Eng., of Knebworth, Herts.

CRAIK.—On May 23rd, at St. Albans-road, Watford, John George Craik, M.B. Glasg.

DONKIN.—On May 30th, Charles Donkin, M.D. Durh., of Bexhill-on-Sea, aged 81.

LAWS.—On May 26th, at Kings Langley, William George Laws, M.B. Edin., F.R.C.S. Eng., formerly of Nottingham, in his 75th year.

MEDICAL NEWS

University of Oxford

The following have been elected members of the committee of management of the new institute of experimental psychology: Sir Farquhar Buzzard, Mr. H. H. Price, Dr. R. S. Creed, and Mr. G. D. H. Cole.

University of Cambridge

On May 30th the following degrees were conferred:

M.D.—W. A. Bourne, C. J. M. Dawkins, W. H. Poole, and B. H. Swift.
M.B., B.Chir.—H. S. Sharp.
M.B.—W. M. L. Owen, C. G. Pantin, J. H. Patterson, and E. G. Pyne.
B.Chir.—K. O. Black, J. R. Bodington, A. B. R. Finn, and E. O. C. Grattan.

Society of Apothecaries of London

The following candidates have satisfied the examiners for the Mastery of Midwifery:—

Monica M. M. M. Fisher, A. L. Gilbey, G. P. Goodwin, Gwynedd Hugh-Jones, Margaret J. T. Leitch, Dorothy Makepeace, M. Y. Paget, and J. H. Spence.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty held on June 1st, with Prof. Archibald Young, the president, in the chair, the following were admitted to the fellowship: William Beattie, John Fleming, William Ian Gordon, Ronald Guthrie Lendrum, and James Wallace Macfarlane (Glasgow), Joseph Charles Pinch (Canada), David Ross (Maybole), and Archibald McLellan Wright Thomson (Glasgow).

Queen's University, Belfast

On July 10th the honorary degree of LL.D. will be conferred on Prof. D. J. Coffey, president of University College, Dublin, and the honorary degree of D.Sc. on Dr. T. H. Milroy, emeritus professor of physiology in the University.

Macalister Lecture

On Thursday, June 25th, at 9 P.M., at the National Temperance Hospital, Hampstead-road, London, N.W., Sir Francis Fremantle, M.P., will deliver the annual Macalister lecture. His subject will be A Doctor in Parliament.

Sussex Medical and Dental Golfing Society

The spring meeting of this society will be held on Sunday, June 14th, at the West Sussex golf club, Pulborough. The hon. secretary's address is 16, The Drive, Hove, 3.

Ex-Services Welfare Society

A conference has been arranged by this society to be held at the Hyde Park Hotel, London, on July 3rd with Dr. Edward Mapother in the chair. The subject for discussion will be some of the sequels of war stress. Further information may be had from the secretary of the society, 51, Victoria-street, London, S.W.1.

Indian Medical Service

The annual dinner will be held at the Trocadero Restaurant, London, on Wednesday, June 17th, at 7.15 P.M., when Major-General Sir Robert McCarrison, C.I.E., will preside. Officers can arrange to sit near their friends, as separate tables to seat eight will be provided. Tickets from the joint hon. secretary, Sir Thomas Carey Evans, Hammersmith Hospital, Ducane-road, London, W.12.

International Hospital Association

A national council of this association has been set up in this country which includes three representatives of every association interested nationally in any aspect of hospital service. Associate members, of whom there is a growing body in Great Britain, will also be represented on the council. The British Medical Association, the British Hospitals Association, the British Hospitals Contributory Schemes Association, the College of Nursing, the Royal Institute of British Architects, the Incorporated Association of Hospital Officers, the National Association of Local Government Officers, and the Pharmaceutical Society of Great Britain have already expressed their desire to become members.

THE deaths are announced this week of two prominent English medical workers in China. John Howard Wright, the well-known medical missionary, died at Tientsin on May 30th, and Dr. Agnes Livingstone-Learmonth, C.B.E., of the Yenching University, Peiping, on May 10th.

Dr. James McLauchlan Johnston has been appointed a deputy commissioner of the Board of Control for Scotland.

King's College Hospital

The King has granted his patronage to this hospital.

St. Mark's Hospital, London

Lord Harewood will lay the foundation-stone of the nurses' home of this hospital on Thursday, June 11th, at 2.30 P.M. A balance of £38,500 is still required to open the home free of debt. It provides accommodation for 50 nurses and 27 maids. During 1935 the hospital admitted more patients than in any previous year of its history, yet the waiting-list is greater than ever.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.
THURSDAY, June 11th.—8.30 P.M. (11, Chandos-street, W.), Symposium on Psychotherapy in General Practice.

RESEARCH DEFENCE SOCIETY.
TUESDAY, June 9th.—3 P.M. (London School of Hygiene, Keppel-street, W.C.), Sir Malcolm Watson: Manson, Ross, and Reed, Pioneers in Research on Tropical Diseases. (Stephen Paget Lecture.)

ASSOCIATION OF CLINICAL PATHOLOGISTS.
SATURDAY, June 13th.—9.45 A.M. (17, Stonegate-street, York), Mr. E. J. King, Ph.D.: Phosphatase as a Test of Hepatic Function. Dr. F. S. Fowweather: Some Observations on the van den Bergh Reaction. Dr. Alan Moncrieff: Jaundice in Children. Dr. A. F. S. Sladden: Two Anomalous Cases of Icteric Tinge. Dr. Howard Collier: "Lead Action" as a Clinical Entity and as a Problem of Clinical Pathology. Dr. King and Mr. G. A. D. Haslewood, Ph.D.: Improvements in the Estimation of Bilirubin. Dr. S. C. Dyke: Adenomatosis of the Liver.

SOUTH-WEST LONDON MEDICAL SOCIETY.
WEDNESDAY, June 10th.—9 P.M. (Bolingbroke Hospital, Wandsworth Common), Sir Lenthal Cheatle: The Relationship of Experimental Pathology to Human Carcinoma. (Bolingbroke Lecture.)

BRITISH ASSOCIATION OF RADIOLOGISTS.
FRIDAY, June 12th, and SATURDAY.—Annual General Meeting at Manchester Royal Infirmary.

PADDINGTON MEDICAL SOCIETY.
TUESDAY, June 9th.—9 P.M. (Great Western Royal Hotel, W.), Dr. A. Baldie: Prospect and Retrospect. (Presidential Address.)

BIOCHEMICAL SOCIETY.
FRIDAY, June 12th.—2.30 P.M. (Marischal College, Aberdeen), Short Communications.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Edinburgh.
MONDAY, June 8th, and TUESDAY.—5 P.M., Sir Thomas Lewis, F.R.S.: Symptoms and Signs of Embolism in the Limbs with Special Reference to Pain. (Alexander Gibson Lecture.)

CHADWICK TRUST LECTURE.
THURSDAY, June 11th.—5 P.M. (Chelsea Physic Garden, Swan Walk, S.W.), Sir William Willcox: Plant Pharmacology and Medical Practice.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, June 8th.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. Bright Banister: Fibromyoma of Uterus.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2.30 P.M., clinical and pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Chassar Moir: Operative Obstetrics. 3 P.M., Dr. R. A. Young: Non-tuberculous Pulmonary Diseases.
FRIDAY.—2.15 P.M., Dr. A. A. Davis: Gynæcological Pathology.
Daily, from 10 A.M. to 4 P.M., medical clinics, surgical clinics or operations, obstetrical and gynæcological clinics or operations, and refresher course.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, June 8th, to SUNDAY, June 14th.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W. Afternoon M.R.C.P. course in neurology and psycho-

pathology.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Tues. and Thurs., at 8 P.M., clinical and pathological M.R.C.P. course.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. All-day course in gynæcology.—ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W. Thurs., 8.30 P.M., Dr. Roland T. de Hellebranth (New Jersey, U.S.A.): The Present-day Treatment, in the United States, of Gastric and Duodenal Ulcers (open to non-members).—CITY OF LONDON MATERNITY HOSPITAL, City-road, E.C. Sat. and Sun., course in obstetrics.—Courses are open only to members.

HOSPITAL FOR SICK CHILDREN, Great Ormond-st., W.C.
WEDNESDAY, June 10th.—2 P.M., Mr. Twistington Higgins: Intussusception, Volvulus, and Mesenteric Anomalies. 3 P.M., Dr. A. Signy: Food Poisoning.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

INSTITUTE OF CHILD PSYCHOLOGY.
WEDNESDAY, June 10th.—6.15 P.M. (Friends House, Euston-road, N.W.), Prof. R. J. S. McDowall: Some Aspects of Environment and Character. 8.15 P.M., Dr. Margaret Lowenfeld: Function of Thought in Creation of Character.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY, June 10th.—4 P.M. (St. James' Hospital, Ouseley-road, S.W.), Dr. C. E. Lakin: Demonstration of Medical Cases.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, June 9th.—3.30 P.M. (General Hospital), Mr. Stirk Adam: The Treatment of Otitis Media and its Complications.
FRIDAY, June 12th.—3.30 P.M. (Queen's Hospital), Mr. Hugh Donovan: Recent Advances in the Treatment of Diseases of the Male Genital System.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, June 9th.—4.15 P.M., Mr. J. P. Buckley: Some Observations on the Surgery of the Gall-bladder.
FRIDAY.—4.15 P.M., Mr. D. M. Sutherland: Demonstration of Surgical Cases.

ANCOATS HOSPITAL, MANCHESTER.
THURSDAY, June 11th.—4.15 P.M., Dr. W. J. S. Reid: Neurasthenia.

Vacancies

For further information refer to the advertisement columns

Accrington, Victoria Hospital.—H.S. £150.
Albert Dock Hospital, Connaught-road, E.—Res. M.O. At rate of £110.
Ashton-under-Lyne, District Infirmary.—Res. Surg. O. Also H.S. At rate of £200 and £150 respectively.
Barking Borough.—Asst. M.O.H. and Asst. School M.O. £600.
Barnsley, Beckett Hospital and Dispensary.—H.P. £200.
Bedford County Hospital.—First H.S. At rate of £155.
Belfast, Royal Maternity Hospital.—Res. H.S. At rate of £100.
Birmingham and Midland Hospital for Women.—H.S. At rate of £100.
Birmingham City Education Committee.—Asst. School M.O. £500.
Birmingham, Selly Oak Hospital.—Res. Surgeon. £700. Pathologist. £750. Also Radiologist. £800.
Blackburn County Borough.—Asst. Dentist. £450.
Bolton Infirmary.—H.S. £125.
Bradford, Royal Eye and Ear Hospital.—H.S. £160.
Bristol General Hospital.—Two H.P.'s, three H.S.'s, Res. Obstet. O., H.S. to Spec. Depts. At rate of £80. Also Cas. H.S. At rate of £100.
***Bristol Royal Infirmary.*—Sen. Res. M.O. £200.**
Bristol, Southmead Municipal General Hospital.—Jun. Asst. Res. M.O. At rate of £200.
Burnley, Municipal General Hospital.—Jun. Res. M.O. £150.
Burton-on-Trent General Infirmary.—H.S. £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency Officer. At rate of £130.
Cardiff, University College of South Wales and Monmouthshire.—Lecturer in Experimental Physiology. £750.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Third Res. H.S. At rate of £75. Also Hon. Assts. in Out-patient Dept.
Chester City (Public Assistance) Hospital.—Jun. Res. M.O. £200
***City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.*—Surg. and Med. Regs. £225 and £175 respectively.** Also Asst. Radiologist.
Colchester, Essex County Hospital.—H.P. £150.
Connaught Hospital, Walthamstow, E.—H.S. and Cas. O. Each at rate of £100. Hon. Physician. Also Sen. Res. M.O. and H.P. At rate of £150 and £100 respectively.
Doncaster Royal Infirmary.—H.P. At rate of £175.
Dreadnought Hospital, Greenwich, S.E.—Receiving Room Officer. Also H.P. At rate of £200 and £110 respectively.
***Dunedin, N.Z., Otago Hospital.*—Radiotherapist. £800.**
Edmonton Urban District Council.—Asst. M.O.H. and Asst. School M.O. £550.
***Elizabeth Garrett Anderson Hospital, Euston-road, N.W.*—H.P., three H.S.'s, and Obstet. Surgeon. Each at rate of £50.**
Halifax Royal Infirmary.—Third H.S. At rate of £150.
Hammersmith Hospital, Ducane-road, W.—Asst. Radiologist. £700.
Hampstead General and N.W. London Hospital, Haverstock Hill, N.W.—H.S. At rate of £100.
Holt, Norfolk, Kelling Sanatorium.—Second Asst. Res. M.O. £350.
Hospital for Sick Children, Great Ormond-street, W.C.—Cas. M.O. £175. Ophth. Surgeon. Also Res. Aural Reg. £150.
Hospital for Tropical Diseases, Gordon-street, W.C.—H.P. At rate of £120.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.P. At rate of £100.
Huddersfield, St. Luke's Hospital.—Res. M.O. £200.
Hull, Municipal Maternity Home and Infants' Hospital, Hedon-road.—Sen. Res. M.O. £450.
Hull and Sculcoates Dispensary.—Res. M.O. £500.
Ilford, King George Hospital.—Res. Cas. O. and Surg. Reg., Res. Med. Reg. Each £150. Two Res. H.S.'s. Each £100.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. £144.
Kent County Council.—Asst. for Tuber. Administration. £900. Also Asst. for Hospital Administration. £800.
Kettering and District General Hospital.—Second Res. M.O. At rate of £125.
Kidderminster and District General Hospital.—H.S. £150.
Leeds University.—Lecturer in Biochemistry. Also Lecturer in Physiology. Each £500.
***Leicester City Mental Hospital, Humberstone.*—Sen. Asst. M.O. £700.**
Liverpool, David Lewis Northern Hospital.—H.S. to Spec. Depts. At rate of £80.
Liverpool Hahnemann Hospital, Hope-street.—Res. M.O. At rate of £120.
Liverpool Sanatorium, Delamere Forest, Frodsham.—Second Asst. to Med. Supt. £250.
Liverpool, Smithdown-road Hospital.—Res. Asst. M.O. £200.
Liverpool University.—Supervisor of Dental Mechanics and Dental Prosthetics. £750.
London County Council.—M.O. (Grade I.). £350. Asst. M.O.'s (Grade II.). Each £250. Also Temp. Dist. M.O. At rate of £235.
London University.—Examinerships.
Maidstone, West Kent General Hospital.—H.S. £175.
Manchester, Ancoats Hospital.—Res. Surg. O. £200. Also Combined H.S. (Aural) and H.P. post. At rate of £100.
Manchester, Christie Hospital and Holt Radium Institute, Withington.—Res. Surg. O. At rate of £150.
Manchester, Hulme Dispensary.—Res. M.O. £250.
Manchester, St. Mary's Hospitals.—Four H.S.'s for Special Depts. Each at rate of £50.
Marie Curie Hospital, 2, Fitzjohn's-avenue, N.W.—Res. M.O. £100.
Monmouthshire County Council.—Asst. M.O. £500.
National Hospital for Diseases of the Nervous System, Queen-square, W.C.—Registrar. £300.
National Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175. Cas. O. and H.S. At rate of £120 and £100 respectively. Also Surg. Reg. 40 guineas.
New Zealand, Wellington Hospital Board.—Asst. Supt., Medical. £1000.
Nottingham General Hospital.—H.S. At rate of £150.
Nottingham Hospital for Women.—H.S. At rate of £150.
Paris-Hertford British Hospital.—Res. M.O. £150.
Plymouth, Prince of Wales's Hospital, Greenbank-road.—Res. Anæsthetist and H.S. At rate of £120.
Portsmouth and Southern Counties Eye and Ear Hospital.—Hon. Asst. Ophth. Surgeon, Hon. Anæsthetist. Also H.S. At rate of £120.
Preston and County of Lancaster Royal Infirmary.—Cas. H.S. £150.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—Cas. O., H.P., and H.S. Each at rate of £125.
Prison Service.—M.O., Class II. £525.
Queen's Hospital for Children, Hackney-road, E.—Asst. M.O. At rate of £200. Also H.S. and Cas. O. Each at rate of £100.
Queen Mary's Hospital for the East End, Stratford, E.—Radiologist. £350.
Reading, Royal Berkshire Hospital.—Hon. Asst. Anæsthetist.
Royal Cancer Hospital, Fulham-road, S.W.—Sen. Asst. Radiologist. £350.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.
St. Bartholomew's Hospital, E.C.—Asst. Physician to Children's Dept. Also Asst. Surgeon.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—H.S. At rate of £65.
St. Peter's Hospital for Stone, &c., Henrietta-street, W.C.—Clin. Assts. to Hon. Staff.
Salford Royal Hospital.—Res. Surg. O. £200. Also two H.S.'s. Each at rate of £125.
Salvation Army Mothers' Hospital, Lower Clapton-road, E.—Hon. Obstet. Surgeon. Also Hon. Clin. Asst.
Shrewsbury, Royal Salop Infirmary.—Res. Surg. O. £250.
Southampton, Isolation Hospital and Sanatorium.—Jun. Res. M.O. £200.
***Southampton, Royal South Hants and Southampton Hospital.*—H.S. to Ear, Nose, and Throat Dept., and Res. Anæsthetist. At rate of £150.**
Southend Municipal Hospital.—Asst. M.O. (Grade 2). £325.
Southend-on-Sea General Hospital.—Med. Reg. and R.M.O. £300.
Stafford, Prestwood Sanatorium.—Jun. Asst. M.O. At rate of £300.
Surrey County Council, Reigate Institution.—Med. Supt. £900. Also Res. Asst. M.O. At rate of £375.
Truro, Royal Cornwall Infirmary.—Hon. Surgeon.
West London Hospital, Hammersmith-road, W.—Med. Reg. to Children's Dept. £100. Also two H.S.'s, H.P., Res. Cas. O., and Res. Anæsthetist. Each at rate of £100.
West Malling, Kent, Leybourne Grange Colony for Mental Defectives.—Asst. Res. M.O. £350.
Westminster Hospital, Broad Sanctuary, S.W.—Two Radiologists.
West Sussex County Council.—M.O.H. £340. Also M.O.H. for Horsham Urban District, &c. £460.
Wolverhampton Education Committee.—Asst. M.O. £600.
Wolverhampton Royal Hospital.—H.S. At rate of £100.
Worksop, Victoria Hospital.—Jun. Res. £120.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Lanchester, Co. Durham.

NOTES, COMMENTS, AND ABSTRACTS

SOME PSYCHOLOGICAL FACTORS IN SICKNESS ABSENTEEISM *

BY THOMAS M. LING, B.M. Oxon., M.R.C.P. Lond.
MEDICAL OFFICER, JOSEPH LUCAS LTD., BIRMINGHAM

(*Concluded from p.* 1276)

Obsessional Manifestations

Although the majority of the pyschoneuroses that go to swell the sickness figures of the country are examples of the anxiety state, mention must be made of the obsessional cases, especially as these are more particularly liable to occur among more educated people and those in administrative positions. One of the best descriptions is to be found in "The Nervous Temperament," [3] where Prof. Culpin outlines the condition as follows:—

"The sufferer says he is forced to think certain thoughts—which may be emotionally unpleasing, apparently futile or abstractly speculative, while recognising them as irrational. The penalty of fighting against them, even when that is possible, is great stress."

James [7] describes the state as a "gnawing craving urgency" and the symptoms are called obsessional: "they rarely display their mental state; they believe strongly in the power and importance of self-control, which they exercise consciously in various directions. They tend to overwork, and give the impression of taking the line of greatest resistance. When a breakdown comes, it is usually ascribed to overwork, though the overwork itself is a symptom and not the cause of the state. They may be over-conscientious either in general or merely with regard to some particular situation."

In my experience it is very rare to find the obsessional state alone among those in employment, and there is nearly always an admixture of anxiety symptoms as well. The following case illustrates a typical example:—

A sorting clerk, aged 22, was frequently ill for a few days at a time with "rheumatism" and dysmenorrhœa. She was the elder of two children and as a child had been under observation intermittently at a leading children's hospital for rheumatism and early cardiac involvement. The home life was fairly happy, although she had a strong antipathy to her father. There had been no rheumatic pains for eight years until she had started work twelve months previously. Further inquiry elicited the fact that the "rheumatism" was always in the sacro-iliac region and only came on when she got "all upset." Actually the pain was identical with the low back pain associated with the dysmenorrhœa. It appeared that she became "upset" as a result of thinking she would go mad and that this feeling came on when there was any rush of work. She kept feeling that she had put two invoices in an envelope instead of one and then wanted to retrieve the envelope to rectify the mistake. As would be expected the same problem presented itself at home; after locking up at night, she always had to go back to make sure that she had really done it. There was marked claustrophobia. "I feel all shut in in a crowd and can't go in a bus; it is the same in a cinema; I can only sit at the end of the row, as otherwise I feel so sick I have to go out." She counts things over and over again, especially houses in a street. Physical examination showed a faint impurity of the apical first sound with no detectable cardiac enlargement and an excellent response to exercise. No other stigmata of rheumatism were found and the general physique was excellent.

In this case the outstanding feature is the marked obsessional symptoms, and when they become incapacitating the patient develops a severe "rheumatic" pain, which is, of course, an acceptable manifestation to her subconscious mind and incidentally one that secured for her a considerable amount of attention during her childhood. The patient was reassured that she was not going mad and was given some understanding regarding the prevalence of obsessional symptoms among the normal population. On learning that she was really just like many people as regards her modes of thinking, the relief was quite dramatic; she still suffers somewhat from dysmenorrhœa, although she has not lost a day more time and has had no further "rheumatic" pains during the last four months.

Extent of Psychoneurotic Illness

Prof. Culpin and Dr. May Smith [3] found significant degrees of neuroticism in approximately 30 per cent. of over 1000 clerical and factory workers, but of not a sufficient degree to incapacitate them from holding their place in the industrial structure. Dr. Halliday, [8] a regional medical officer under the Insurance Act in the Glasgow area, has recently published a most valuable paper which summarises the results of examining 1000 consecutive cases of panel patients who have been absent for more than twelve weeks under the N.H.I. As he points out:—

"The Act had been in operation for twenty years before a survey was made of the reasons for incapacity given by insurance practitioners on the medical certificates. In Scotland, in 1932, the Department of Health issued its first report on the subject. This dealt with the sickness statistics for the insured population for the year from July 1st, 1930, to June 30th, 1931. It was followed by similar surveys for the corresponding annual periods of 1932 and 1933. What information do they contain about the reason for incapacity? Averaging the figures for the three years under survey, the group of "respiratory diseases" occupied first place, being responsible for 42 per cent. of all incapacities. Tying for second place came "rheumatism" and diseases of the digestive system, each providing 10–11 per cent.; violence and skin affections were next, each providing 8–9 per cent. What part is played by the psychoneuroses? A very small part according to the reports—not more than 2 per cent.—and this figure is made up by including such cases as "cardiac debility" and "tachycardia." This picture of the overwhelming predominance of organic disease conflicted with the impression I had found while acting as a medical referee under the Insurance Act. . . . Many of these patients were unfit to work, but the reason for their defective function was, in my opinion, not organic but psychological."

As a result of this inquiry Dr. Halliday has shown that one-third of these patients were disabled primarily by a psychoneurotic condition and that minor associated physical disorders were not in any way the cause of their absenteeism. His figures do not reflect the incidence of psychoneurosis among all the patients examined, but only its occurrence when it acted as the reason for incapacity. A somewhat comparable inquiry was carried out in 1930 among industrial workers in the United States by Dr. C. P. McCord. [9] He investigated a large group of train despatchers, who sit at desks wearing a telephone receiver over one ear and receive as many as 200 items per hour for record or a decision that may involve life and death for train passengers or crews. There is thus present a constant source of fear and McCord found that 82 per cent. of these train operatives showed cardiac disturbances, of a type comparable to the "soldier's heart" or D.A.H. that arose in such large numbers under comparable conditions during the late war.

In view of the importance of the subject, I have analysed the case records of 200 consecutive cases of sick employees, who have been seen either on their return to work after sick leave or who have been referred for an opinion owing to prolonged absence. It should be realised that the policy of the organisation towards their sick employees is a generous one.

* Paper read before the Association of Industrial Medical Officers at the London School of Hygiene and Tropical Medicine on March 27th, 1936.

The staff receive full pay, while in the case of workers the N.H.I. money is augmented from a special fund, the amount being dependant on the individual's social conditions in each case. In no instance is a worker discharged from the company on account of illness. Naturally the diagnosis varies widely and such indefinite terms as "gastritis," "respiratory catarrh," and "anæmia" are frequently found. The relative unimportance of the actual diagnosis placed on the certificate has been referred to by Culpin,[3] Howe,[4] Ross,[6] Halliday,[8] and Lockhart.[9] The latter has summed up the situation appropriately:—

"These stereotyped descriptions of highly complicated processes are, with few exceptions, valueless to the student of social problems. The certificates deal largely with symptoms or symptom-complexes, to which orthodox labels have been given. They are merely evidence that a person is ill and is entitled to sick benefit."

Most panel practitioners, with whom the matter has been discussed, agree with this, but unfortunately the patient is the unwitting victim of a bureaucratic and medical subterfuge as the presence of a certified "disease" provides him with just the honourable but regressive escape that he is seeking, to protect him from having to deal with the situation in an appropriate manner. Owing to the totally inadequate training in the subject given to the average practitioner, the latter tends to react to the situation in a comparable way, and emphasises the organic symptom as a protective mechanism against his own ignorance of mental processes.

Perhaps one of the most significant facts is the extent to which the "diagnoses" on the sick notes are in reality monosyllabic descriptions of one or other manifestations of the anxiety state; "tachycardia," "gastritis," "rheumatic chill," and "abdominal pain" reappear with monotonous regularity, but in my experience even an organic label, such as "bronchitis" or "tonsillitis," fails not infrequently to manifest any of the physical signs so assiduously learnt and memorised by the student, and masks an underlying emotional disharmony.

An Assessment of Incapacity

In the survey referred to above the degree of psychoneurotic symptoms has been ascertained and an assessment made of the extent to which they are incapacitating the patients from following their normal course of employment. The cases have been allotted to one of the following three groups:—

Group 1: A recognised physical disorder.—Forty-one per cent. of the cases that have come under observation, either on their return to work or as a result of prolonged absence, fall into this group. The following case illustrates the chief characteristics of those included under this heading:—

A woman, 23 years of age, the eldest of four children, had been away for two weeks as a result of tonsillitis and had been in bed for one week. During her illness she had marked dysphagia and swelling of the cervical glands, and when seen there was still some infection of the anterior pillars. She volunteered the information that she was glad to be back at work; "it's so much nicer with the rest of the crowd, they are all so friendly." During her leisure she goes to cinemas with her boy and goes cycling with the club. Does not get worried; always feels fresh in the morning; rather likes noise. When asked how she felt if sent for by the foreman she replied: "Oh, I don't mind; he's a good scout and I do my best, so why worry?"

This is a case of a well-adjusted happy individual, who is able to feel comfortable both with herself and with her fellow-workers. There are no complaints about noise or supervision, the two outstanding factors upon which so many workers tend to project their own disharmonies.

Group 2: Definite psychoneurotic symptoms complicating and prolonging absence due to a recognised "organic" disease; 32 per cent. of the cases fall into this group, of which the following is a typical example:—

A woman, aged 27, had been away for nine months with heart disease, which was attributed to frequent attacks of influenza. There was an indefinite history of rheumatism as a child with irregular attacks of growing pains. She was the fourth of six children and had been living with an uncle for some years. She was perfectly well until May, 1935, when she was transferred, against her wishes, from one factory to another. At the end of June, 1935, she went to bed with an attack of influenza characterised by general lassitude, headaches, and pains in the arms, and remained in bed until November. She had been engaged for two years and by the summer of 1935 the young man was getting insistent on their getting married, which the woman was very loth to do. As she expressed it: "Of course, if I had not got ill I should be married by now; it was worrying me for months and I could not sleep." In addition she gave a history of marked fear of the dark and claustrophobia, with generalised anxiety if she ever had to go in buses.

When seen she had evidence of well-compensated mitral incompetence with an excellent response to exercise. She stated that she did not yet feel well enough to work, as she "kept on getting so worried over everything." Her domestic situation was discussed briefly and it was obvious that she was lacking courage to break off her engagement and she was consequently given some help and reassurance on the subject. A week later she returned to say that she now felt perfectly well and quite fit to return to work; she had solved her problem by breaking off her engagement and since then has kept perfectly well.

This is a case showing an admixture of organic disease in the shape of a rheumatic carditis undoubtedly prolonged by an associated emotional condition.

Group 3.—Cases where the *manifestations* are *essentially emotional in origin* and the individuals either state that they are away on account of "nerves" or complain of disharmony in various systems of the body without clinical evidence of pathological change; 27 per cent. of the cases away for more than two weeks are under this heading, and the following case illustrates the chief points at issue:—

A man, aged 20, was seen as he had been away for three weeks with "palpitation." He gave a history of generalised fear and worry for the last three months. Further inquiry elicited the fact that he was the only son of a man who had shell-shock during the war and had been unable to work ever since. The home atmosphere had always been one of apprehension and the boy was deeply attached to both parents. Two years previously he had married against his parents' wishes and his married life had been fraught with many difficulties. He kept wanting to return home and a month before he went "ill" he was separated from his wife and he returned to his parents' home.

The physical examination was essentially negative and his inner disharmony was manifested by numerous complaints about his heart, although his cardiovascular system was clinically normal.

As would be expected in this case, the individual was dissatisfied with his work and decided to seek employment elsewhere. Admittedly the demarcation between the various groups is somewhat arbitrary, as the diagnosis of a psychoneurosis is arrived at, as in other causes of incapacity, by a combination of many points of medical evidence, no one of which is typically diagnostic of anything in particular, but which, in combination, lead to a judgment of causes as sound as in organic disease.

The Remedy

Here then is a major problem, social, economic, and medical, that is yearly becoming more pressing and is of equal interest to those who are responsible for training doctors and to those, like ourselves, whose duty is primarily towards the patient, his environment, and his occupation. It is generally agreed that the seeds of adult neuroticism are sown in the

first few years of life and in this connexion the problem is comparable to the prevention of crippling among children and young adults. Correct feeding and the prevention of rickets is all-important and is indicated for all children; in the same way good mental health for all children is just as attainable, and I believe that the next 30 years will witness as great a development along these lines as the present century has evidenced in the prevention of crippling. When adolescence is reached the problems of the rapid changes of advancing maturity demand our help and guidance; day continuation schools, as empowered by the Hadow Act, should be a much bigger feature of industry than they have yet become, and the teaching of a sound biological approach to life and its situations should be an integral part of the curriculum.

On the medical side a complete reorientation of viewpoint is required, and this must be started in the formative years of the medical student's life. He must be taught to view the patient as a living integrated whole and in relation to his home circumstances and his occupation. As Sir Walter Langdon-Brown [10] points out it must be realised "that the boundaries of medicine are contemporaneous with life. Medicine touches life at every point." It is generally asserted that the development of scientific methods of investigation, radiological, pathological, and biochemical, which have of necessity to be centralised in hospitals and clinics, has robbed the general practice of medicine of much of its interest and that many family doctors are just "sign-posts" to the specialists and technical experts. Such an attitude seems most regrettable, but actually the situation is a real opportunity for the regeneration of the practice of medicine along broader and more productive lines. The practitioner has a unique opportunity to investigate and assess the various environmental and social factors mentioned previously, and this privilege is especially opportune among those intimately concerned with the industrial setting. We have an opportunity of observing the effect of seed on soil, and even more important, of improving the soil and at the same time of moving the growing seed to the most suitable soil for its own constitution.

Our approach to the patient must be essentially biological and all aspects of the case, physical, emotional, and environmental, must be brought forward and the relative importance of each factor assessed in determining the ætiology of the condition and the appropriate treatment. Though not infrequently one meets with cases for whom one can do comparatively little, either because the mental calibre is inherently too poor to mould towards a better condition, or because they are the victims of an environment from which they neither can escape nor to which they can adjust, nevertheless it is certain that the majority of people can be helped very appreciably. To not a few, the mere fact that the sufferer finds a sympathetic and understanding listener who does not laugh at him or tell him that there is nothing the matter with him, is a source of very real comfort and is sufficient help to enable him to face his problems on a more realistic basis, and to take a more roseate view of the future. Where facilities occur for some suitable adjustment to be made in the type or conditions of employment, there is an added therapeutic weapon of very real value and one that we in this room are especially in a position to utilise to the full. Quite apart from a change of occupation, it frequently happens that the neurosis has been precipitated by a conflict of personalities and in such cases it is often possible to give the person in authority some understanding of the situation and suggestions for remedying it.

There is no value in a vague eclecticism or a dilettante recognition of the psychological factor in disease, but once it is realised that every patient is an individual suffering from "dis-ease," due to a number of contributory factors, both physical and mental, and worthy of our help, irrespective of the extent and objectivity of the underlying pathology, a new viewpoint in medicine is opened up. This aspect, frequently referred to as the Neo-Hippocratic approach, is in reality a return to Hellenic medicine from the materialism of the last century, and Plato in the Dialogues [11] epitomises the situation for us in the words that he attributes to Socrates: "And, therefore, if the head and body are to be well you must begin by curing the soul," that is the first thing . . . and he who taught me the cure and the charm added a special direction "Let no one," he said, "persuade you to cure the head until he has given his soul to be cured, for this is the greatest error, that physicians separate the soul from the body."

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7. James, W.: Principles of Psychology, London, 1890, vol. ii., p. 542.
8. Halliday, J. L.: Brit. Med. Jour., Suppl., March 9th, 1935, p. 86.
9. Lockhart, L. P.: THE LANCET, 1934, i., 825.
10. Langdon-Brown, Sir W.: Brit. Med. Jour., Suppl., March 16th, 1935, p. 93.
11. Cassidy, Sir M.: Brit. Med. Jour., 1934, i., 45.

A JEWISH MEDICAL CENTRE

AT a time when the problems of Palestine have been forced on the attention of the British public it is interesting to hear of a large scheme of medical development now being undertaken by the Jewish authorities. As we reported last March, Dr. J. J. Golub, of New York, was asked to act as consultant in planning a new medical centre to be built on Mount Scopus, Jerusalem, beside the Hebrew University. He informs us that the Hadassah and the American Jewish Physicians' Committee in New York have obtained land, are raising the funds, and have drawn plans for this new medical centre that will equal, in standards of medical care and possibilities in medical education and research, the best of such institutions in America and Europe. It will consist of six buildings, namely: (*a*) a main hospital building (about 260 beds); (*b*) a maternity building; (*c*) a professional and administrative building for the X ray and radium institute, operating rooms, and the general administration; (*d*) an out-patient department; (*e*) the Henrietta Szold school of nursing; and (*f*) the Nathan Ratnoff medical school. The group will be known as the Rothschild-Hadassah University Hospital and the Medical School.

"Wherever Jews live in large numbers," Dr. Golub says, "one often hears questions as to whether Jewish health agencies supported by Jews and serving Jews are needed; as to whether a medical school under Jewish auspices should be established. In so far as these questions concern Palestine, they have been answered clearly and definitely, since the plans, the building programme, and affiliation arrangements between Hadassah and the Hebrew University have been agreed upon and approved by all persons concerned, and have been endorsed and supported by thinking leaders of Jewish life in Palestine and elsewhere." The new medical centre will further medical education by providing hospital clinical appointments, and university recognition of the best qualified in the profession. It will create opportunities for scores of German Jewish refugee physicians who seek a new home in Palestine, and it will have about 20 places for interns. Palestinian girls will be trained as nurses with a curriculum covering three years. The medical school building, it is stated, will contain facilities for research on cancer, hormones, parasitology, bacteriology, physiological chemistry and pathology. Patients' wards will be no larger than of six beds each for adults, and eight beds for children, with adjoining smaller wards of two and three beds. Single rooms are provided for acutely sick patients, for isolation of patients with contagious diseases, and also for private patients.

The work of construction will begin on July 1st, and it is hoped that the centre will be a model institution for the East. The architect is Mr. Erich Mendelsohn.

COMFREY

COMFREY is a forgotten "wort" and Dr. Macalister in an engaging little book [1] gives the results of his investigations into this ancient remedy. It was known to the Turks and Saracens as "wound wort," and for centuries was held in high repute by the medical profession.

Dr. Macalister's interest in comfrey was aroused by reading a paper in THE LANCET of 1896 by Prof. W. Thompson, and he then began a careful investigation and was stimulated to carry out numerous experiments in the clinical material at his disposal. He gives the results of these experiments which prove that the mucilaginous infusion of the powdered root has a distinct and undeniably beneficial effect on the healing of serious and intractable ulcers.

Dr. Titherly was able to isolate a crystalline solid, allantoin, from the root of comfrey and this substance was found on experiment to have a certain definite therapeutic action. It is primarily a cell proliferant and it has in addition the power to produce rapidly a frank leucocytosis. When applied in solution to ulcers or when injected into the bulb or stem or plants the results are obvious to the naked eye. Its value in the treatment of pneumonia and peptic ulcer is less easy of demonstration, but the reader will find some interesting speculations in regard to this aspect of its therapeutic action.

From ancient times comfrey has been known and used as a curative agent, and even to-day the country people have faith in comfrey as a healer. Dr. Macalister has shown in this interesting communication the reason for this faith.

LETTERMANN'S FOOT SUPPORTS

ACCORDING to a report by Dr. W. Bennewitz from the surgical hospital at Wuppertal-Unterbarmen, where the foot supports introduced by Dr. A. Lettermann of Berlin have been in use for eighteen months, they are of positive value in many deformities of the foot. Moreover, they have been used with success as a prophylaxis after fractures of the leg have been taken out of plaster-of-Paris. The support is made of a substance which becomes soft when heated, and when plastic is placed in the shoe. When the patient walks about the substance gets squeezed into the hollows of the foot and within ten to twenty minutes hardens to make an accurately fitting support. The support to the arch of the foot is of course not quite as rigid as that of a metal support, but can replace it for most purposes. Apart from actual deformity these supports are claimed to have application in some forms of functional insufficiency. They are distributed in this country by Messrs. Allen and Hanburys Ltd., who supply a booklet setting out the principles of application with extracts from medical reports.

NEW PREPARATIONS

CROOKES' SUPER-D OIL.—The Crookes Laboratories (British Colloids Ltd., Park Royal, N.W.10) offer under this name a standardised natural liver oil of very high potency derived from fishes of the scombridæ family. The vitamin-A content is stated to be 48,000 international units per gramme, and the vitamin-D content 50,000 I.U.—"as much as 500 times the amount of vitamin D as is contained in an average cod-liver oil." The manufacturers refer to recent observations showing that natural vitamin D is not the same substance as calciferol (irradiated ergosterol), being free from toxic substances and effective in smaller quantities. The dosage of Crookes' Super-D oil suggested for rickets is 5000–6000 I.U. of vitamin D daily, and the convenience of the preparation lies in its high concentration. It is sold in 5 c.cm. vials, with dropper, and each drop is estimated at 1350 I.U. of vitamin D and 1700 of vitamin A. It is also to be had in capsules of 8000 and 10,000 units respectively. Mention is made of the use of vitamin D in massive doses for hay-fever, asthma, and arthritis.

ACRIFLAVINE B.D. (Intravenous).—In THE LANCET of Feb. 8th last E. W. Assinder reported good results from the use of intravenous acriflavine as a urinary antiseptic in nearly 5000 cases of acute gonorrhœa. The supplies of acriflavine available in 1932–34 were unsatisfactory because they often caused damage to the liver, shown by jaundice; but in June of last year Imperial Chemical Industries Ltd. produced "an acriflavine which is apparently non-toxic." This is now issued by the British Drug Houses Ltd. (London, N.1) as Acriflavine B.D. (Intravenous). Apart from gonorrhœa Assinder found acriflavine valuable in *B. coli* infections of the urinary tract.

TRANCUSALVE is an ointment that has been produced by Transcutan Ltd., Leeds, for painful conditions such as fibrositis, gout, and arthritis. It is stated to contain salicylates, ethereal oils, kieselguhr, and concentrates of certain spa waters, in a lanolin base. The ointment can be thickly smeared over the affected part and may therefore be applied when there is much tenderness. It is supplied in collapsible tubes.

A GLARE SHIELD FOR SPECTACLES.—Theodore Hamblin Ltd. (15, Wigmore-street, London, W.1) have improved the Klippon Glare Shield introduced last summer. It consists of two moulded discs of non-inflammable material; an elastic band unites the discs, and its tension is enough for them to grip the frame of any pair of spectacles, to which the device can be fitted in a few seconds. The appearance is then similar to that of ordinary sun-glasses. The shield is cheap, very light, and can be folded into a small purse when not in use. It is produced in three tints: No. 1 is bluish and corresponds to the standard London Smoke No. 3; No. 2 is greenish-yellow and has the same effect on the ultra-violet spectrum as Fieuzal 4; and No. 3 is grey, similar to Crookes' B.2.

Under the title "Medical Products of Precision," Messrs. EVANS SONS LESCHER AND WEBB LTD. (56, Hanover-street, Liverpool) issue a handbook describing the more important of the preparations manufactured at Evans' Biological Institute, Runcorn. Among these are standardised sera, vaccines, organotherapeutic products, and colloidal and other solutions. A supplementary announcement is made about the latest of the Hepatex series of liver extracts, Neohepatex, which is recommended for intravenous or intramuscular injection in pernicious anæmia.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Week-end courses will be held in fevers at the Park Hospital (June 20th and 21st); surgery at the Prince of Wales's General Hospital (June 27th and 28th); children's diseases at the Princess Elizabeth of York Hospital (July 4th and 5th); heart and lungs at the Victoria Park Hospital (July 11th and 12th). An all-day course in proctology will be given at St. Mark's Hospital (July 6th to 11th); an afternoon course in dermatology at the Blackfriars Skin Hospital (July 13th to 25th); and a fortnight's course in urology at the All Saint's Hospital (July 13th to August 1st). On Thursday, June 11th, at 8.30 P.M. at the Royal Society of Medicine, Dr. Roland de Hellebranth, of New Jersey, U.S.A., will lecture on the present-day treatment, in the United States, of gastric and duodenal ulcers. All members of the medical profession are invited to be present. Further information about the courses may be had from the secretary of the fellowship, 1, Wimpole-street, London, W.

[1] Narrative of an Investigation Concerning an Ancient Medicinal Remedy and its Modern Utilities. By Charles J. Macalister, M.D. Edin., F.R.C.P. Lond., Honorary Consulting Physician, Royal Southern Hospital, Liverpool. London: John Bale Sons and Danielsson Ltd. 1936. Pp. 60. 2s. 6d.